The Life and Death of Dinosaurs

OFFICIAL EXHIBIT GUIDE

BY "DINO" DON LESSEM
DINOSAUR PRODUCTIONS

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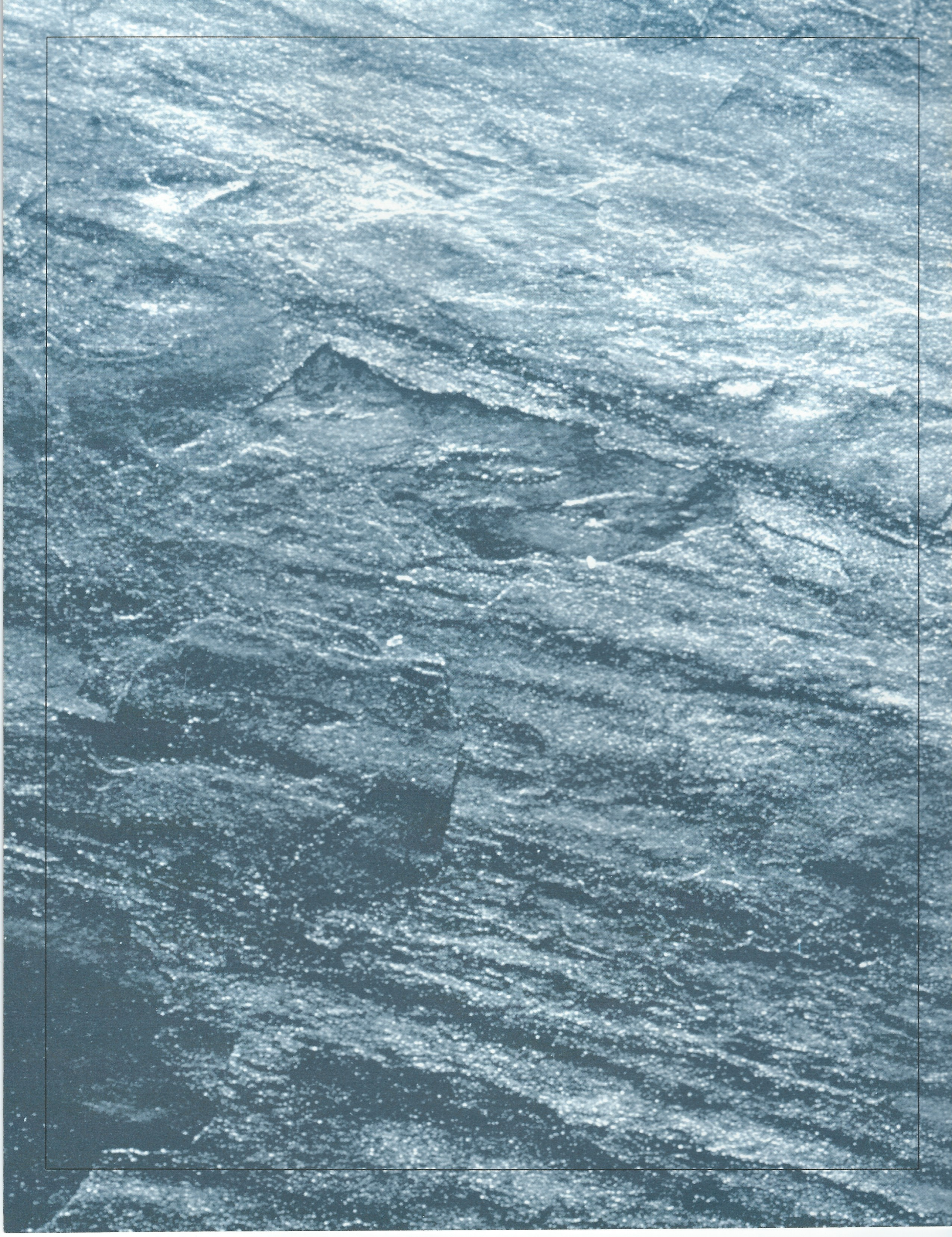

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JURASSIC PARK

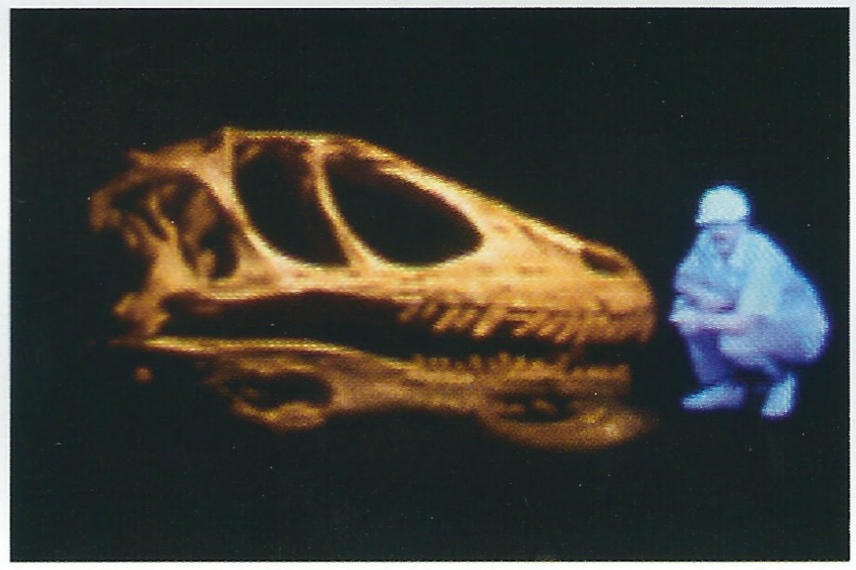
INTRODUCTION

Welcome to the REAL

LOST WORLD JURASSIC PARK!

Steven Spielberg's Jurassic Park and its sequel, The Lost World, are two of the most successful films in the history of movies. Key reason for that success is the subject matter — dinosaurs — themselves among the most successful animals of all life's history. The Jurassic Park films present dinosaurs more convincingly than ever in the entertainment media. But, like any attempt to recreate a mysterious and vanished group of creatures, they are part fact and part fantasy.

THE DINOSAURS OF THE LOST WORLD JURASSIC PARK is an exhibit devoted to the facts of dinosaur life, uniquely illustrated with the aid of the spectacular dinosaur sculptures from Steven Spielberg's films. Dinosaurs ruled the Earth for 165 million years then vanished 64 million years before the earliest humans. But they have left us many clues to their identity and questions about their lives. What were the ancestors of dinosaurs? What did dinosaurs eat? What sounds did they make? Did they care for their young? How did they fight? What environments did they live in? What other animals lived in their worlds? And finally, and most puzzling of all, how did the dinosaurs die?



This exhibit addresses the current scientific answers to these questions with fossil evidence from dozens of dinosaurs rarely seen before. Some are new-found, some bizarre, some huge. All once walked the Earth.

Now you can see them again, on the same parade through time dinosaurs made around the world beginning more than 225 million years ago. By the end of your walk through dinosaur time you may learn some surprising truths about dinosaurs in life, and in the movies.

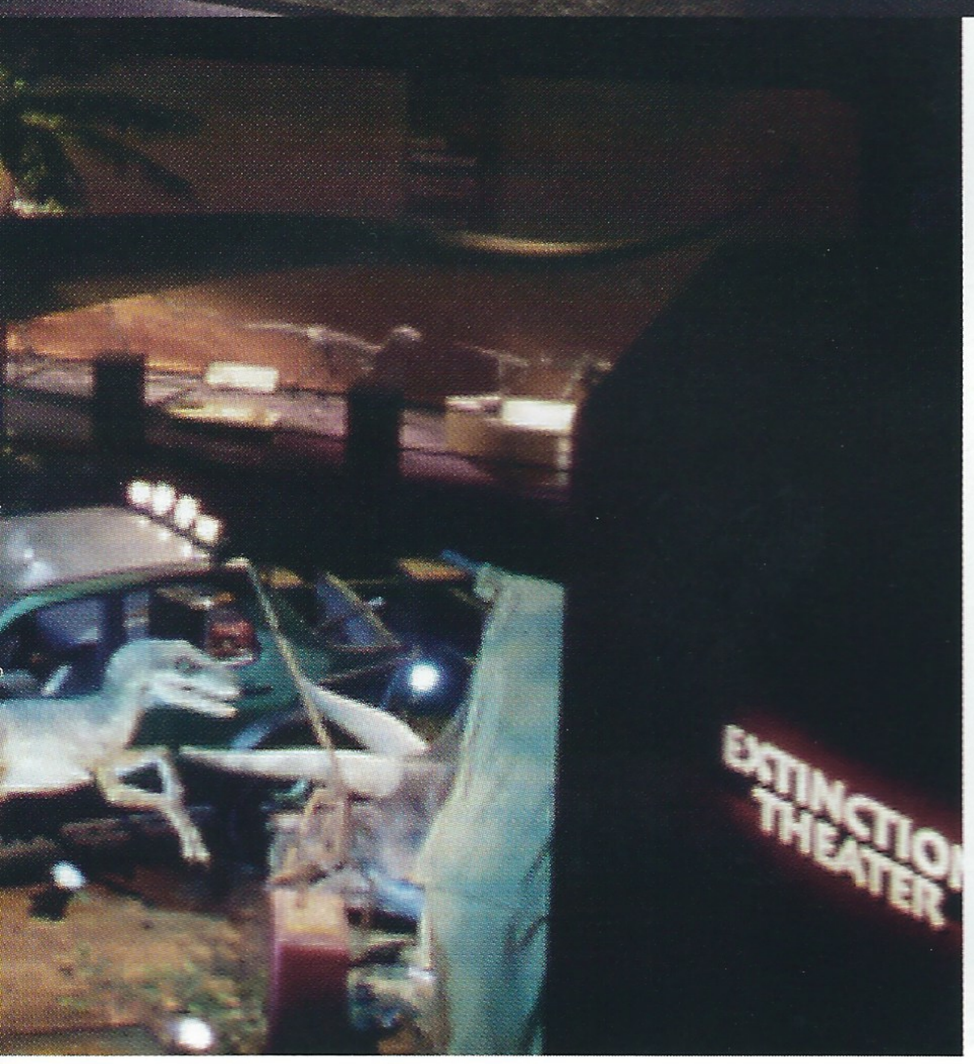
Dino Don Lessem

Exhibit creator Don Lessem is featured in this three-dimensional illusion next to a Deinonychus "raptor" skull.

THE LIVES OF THE DINOSAURS

All of our evidence about dinosaurs comes from fossils — remains of the dead. Yet, scientists can deduce much about how dinosaurs lived from these clues — enough, at least, for artists to imagine the rest when they recreate dinosaurs. Our awareness of dinosaur behavior is growing even faster than our knowledge of dinosaurs themselves — and we find a whole new kind of dinosaur every six weeks.

LOST WORLD
JURASSIC PARK
FIGHTING
FANTASY
OR SCIENC


EXTINCTION
THEATER

GROWING UP DINOSAUR

Dinosaurs grew from eggs, and grew quickly. Fossil discoveries show dinosaurs found sitting atop their nests of eggs. Duckbill dinosaurs may even have fed their babies wads of plant throw-up. Footprints of huge plant-eaters show that the young were sheltered in the center of the herd.

Were all dinosaurs caring parents? We don't know. Perhaps not always. The babies of some dinosaurs have been found in the stomachs of adults of the same species.

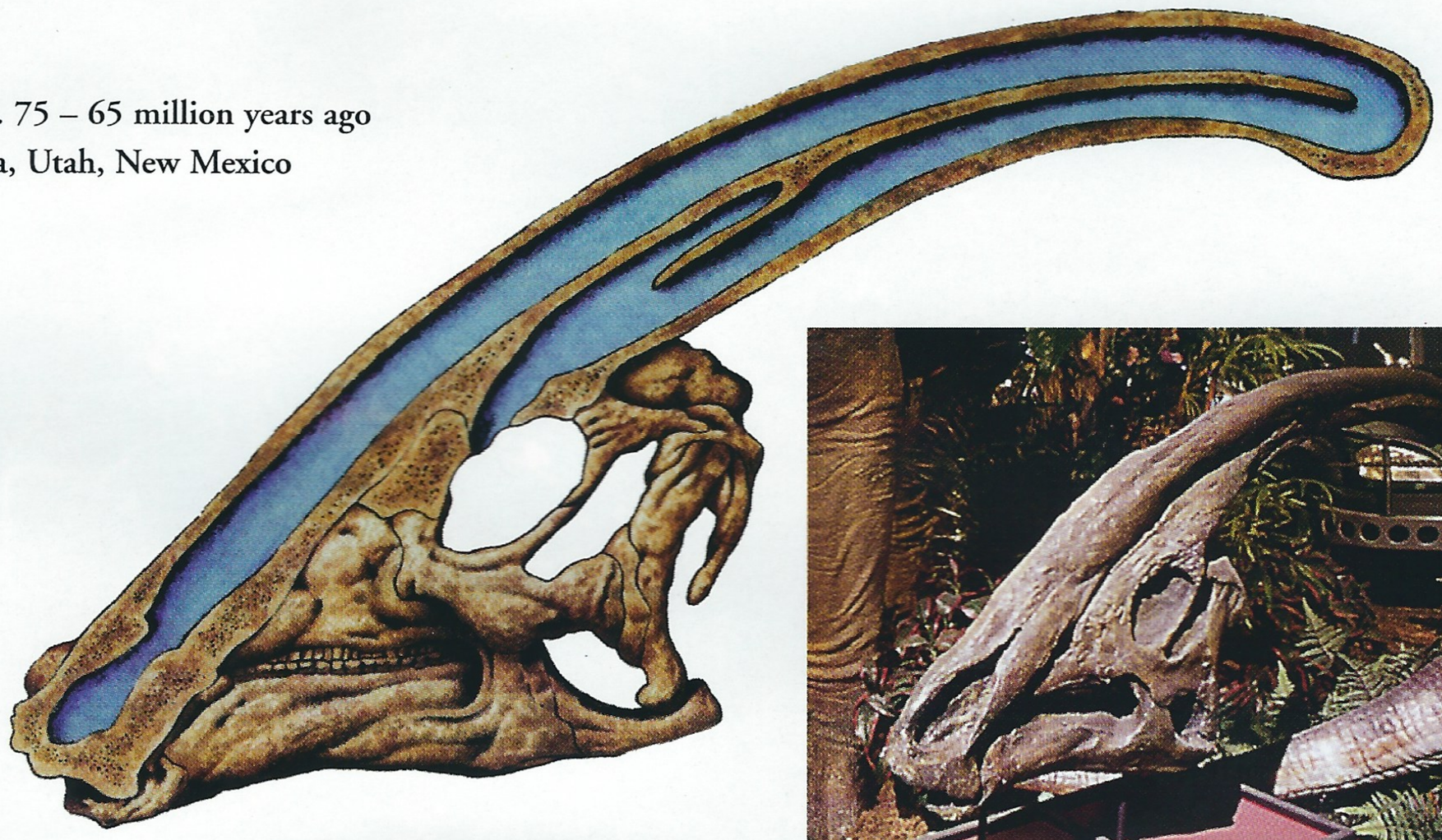
Since we have never found a baby T. rex, we have no knowledge of that dinosaur's parental behavior.

Baby T. rex in the exhibit (above), and in the movie (below).

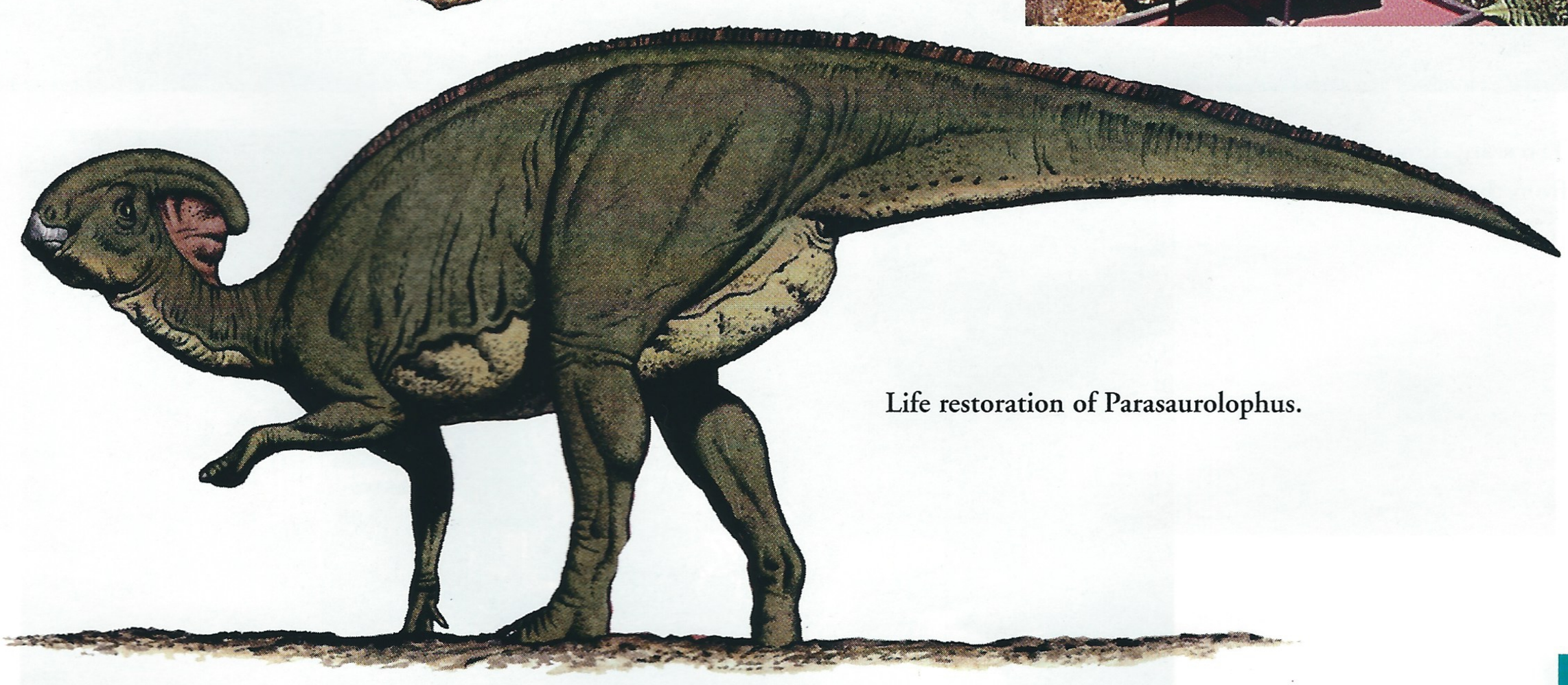
COMMUNICATION

Dinosaurs had many ways of communicating. For many, horns and crests were warnings to rivals and lures to mates. Some dinosaurs could hear well, and predators such as T. rex may have been able to see with depth perception not unlike our own. As for sounds, we can't be certain what noises most dinosaurs may have made. But the horn tubes of some duck billed dinosaurs indicate that these may have been elaborate noise-makers. With its six-foot long nose tube, Parasaurolophus might have blasted out a loud high pitched hoot.

SIZE: 30 feet long
TIME: Late Cretaceous, ca. 75 – 65 million years ago
FOSSILS FOUND: Alberta, Utah, New Mexico



Skull of Parasaurolophus; drawing of cutaway of skull showing air passage.



Life restoration of Parasaurolophus.

FIGHTING

Though we often imagine dinosaurs as vicious killers, most were plant-eaters. Even among the meat-eaters, scavenging may have been as much a way of life as hunting.

Still, fossils show abundant evidence of dinosaur battles. The toothmarks of a T. rex have been found on duckbilled and Triceratops bones and even inside the face of another T. rex.

Other dinosaurs have been found locked in battle as they died. The vicious dromaeosaurid "raptor" dinosaur has been discovered with tiny tooth holes in its skull, where other "raptors" bit into its head.

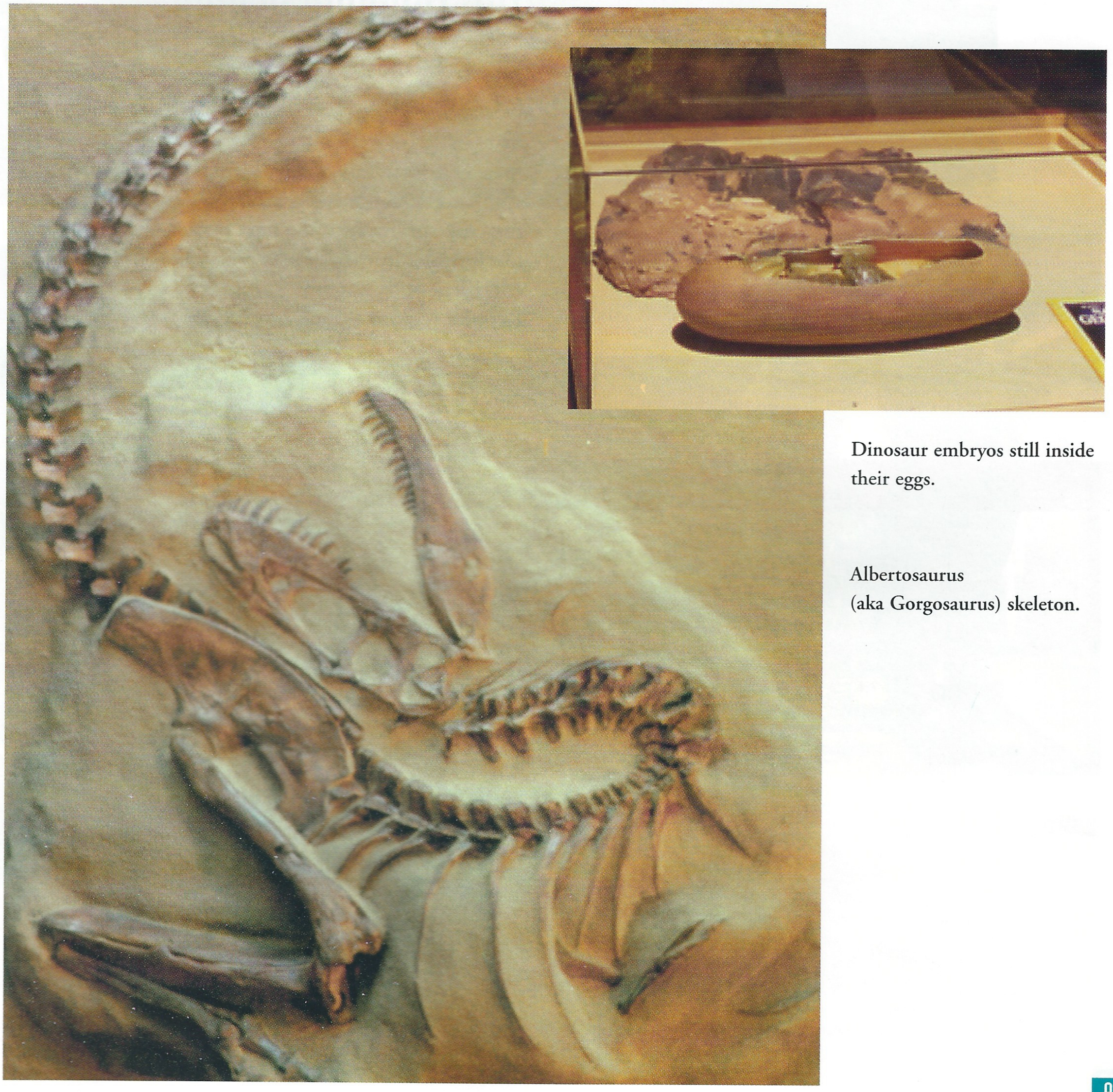
Footprints and bone assemblages indicate that some meateaters, "raptors" included, may have hunted in packs as wolves do today.

T. rex attacking, in two scenes from the movie.

THE PROOF

Fossils provide our evidence for dinosaur lives. These included not just bones, but teeth, skin impressions, footprints, plant food, even waste. Among the rarest and most revealing are the tiny embryos of dinosaurs still inside their eggs. But fossils are rare, and difficult to find. Half of the few hundred dinosaurs we have named, are known from a single fossil tooth or bone.

There is much we still don't know about the lives of dinosaurs. Were they hot-blooded? How long did they live? We may never know the answers to some of our questions such as what color dinosaurs were.

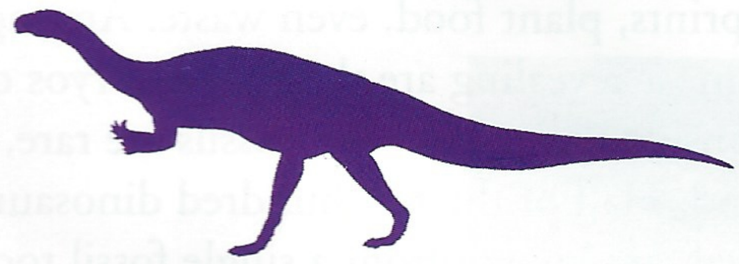


Dinosaur embryos still inside their eggs.

Albertosaurus
(aka Gorgosaurus) skeleton.

DINOSAURS THROUGH TIME

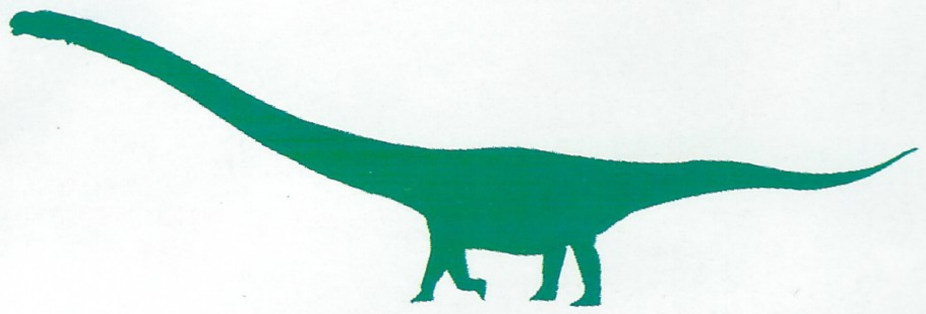
Dinosaurs were one of life's great successes. For 163 million years they ruled the Earth. In that time the shape of the land and the plants and animals on it changed many times. Scientists divide the dinosaurs' time, or Mesozoic Era, into three distinct periods. Each had its own communities of dinosaurs, and other plants and animals.



THE TRIASSIC PERIOD

245 to 200 million years ago

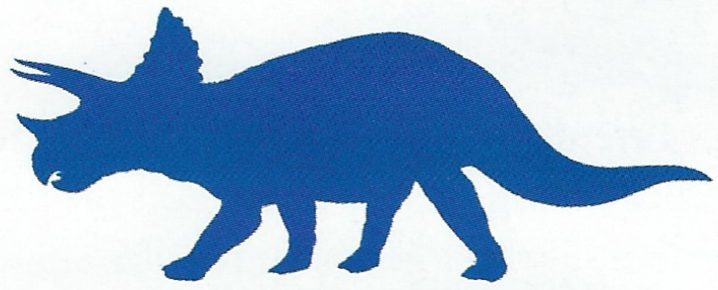
Dinosaurs first appeared 228 million years ago in the first part of the middle period of life's history — the Mesozoic Era. Dinosaurs were not the biggest animals of this time. But unlike many larger animals they did survive into the next period of the Mesozoic, the Jurassic. In the Triassic, The Earth was a single continent with warm and sometimes wet weather. Reptiles took to the air and the sea.



THE JURASSIC PERIOD

200 million to 145 million years ago

In the middle period of dinosaur life some dinosaurs grew gigantic. Plant-eaters grew to six stories high and meat-eaters stretched longer than a school bus. But there were many smaller dinosaur meat-eaters and plant-eaters as dinosaurs became the ruling animals on land. The Earth split into two super-continents. The weather was still warm but more varied in climate. Sea and air reptiles grew enormous as well.



THE CRETACEOUS PERIOD

145 million to 65 million years ago

In the last dinosaur period, the continents took on a shape much like today by the end of dinosaur time. The weather, still warm by today's standards, ranged from cool to hot. Flowers appeared and so did many modern kinds of insects. Dinosaurs lived in deserts and polar darkness. They grew both huge and small. Efficient plant-chewers and the most powerful meat-eaters appeared near the end of dinosaur time.

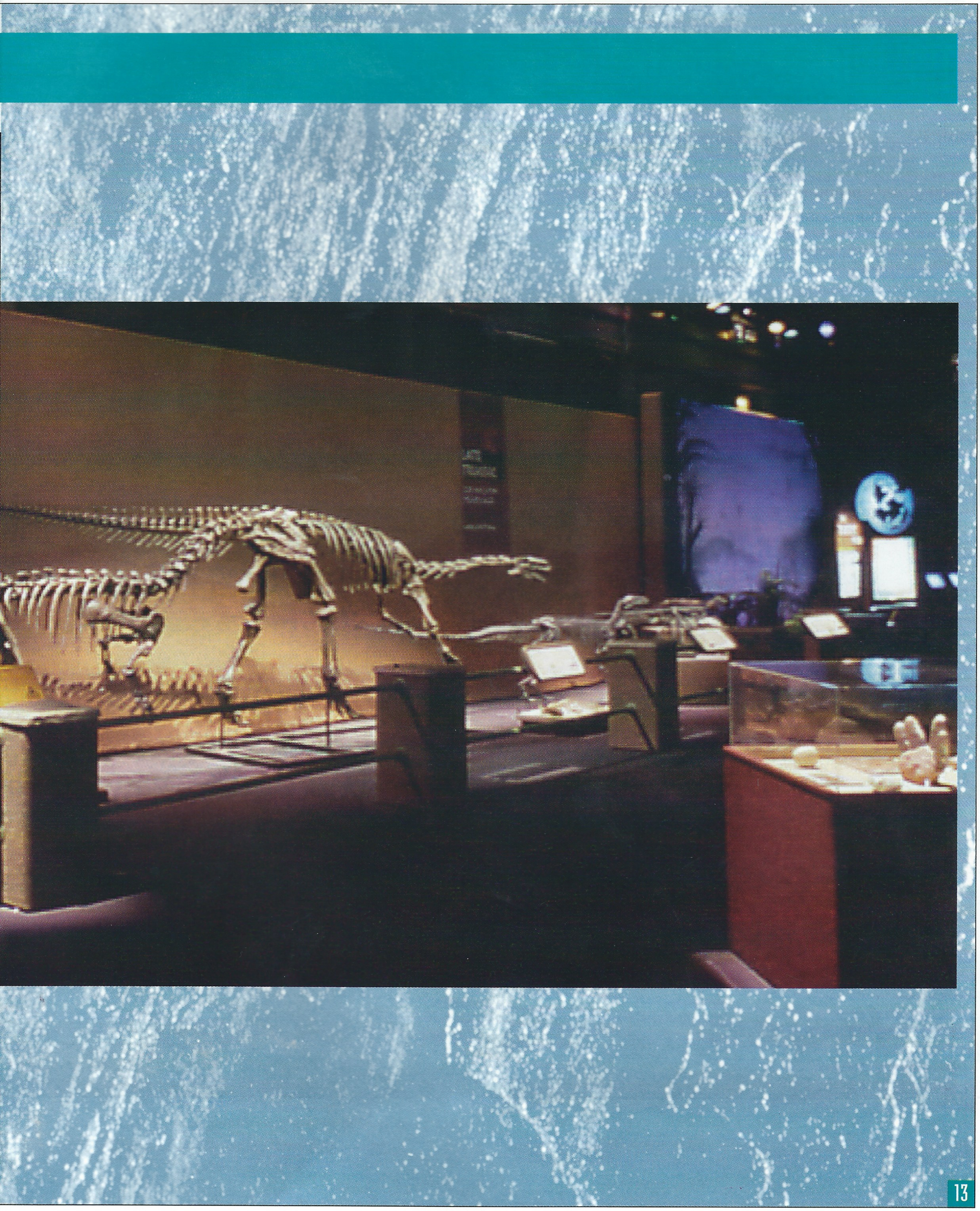
THE TRIASSIC — THE BIRTH OF DINOSAURS

245 million to 200 million years ago

Dinosaurs are descendants of reptiles which lived only on land, beginning in this warm and united Triassic world. Other, even larger early reptiles shared the turf. The largest, most frightening animals of this time were not dinosaurs, but crocodile-like carnivores, some 30 feet long.

The dinosaurs and many of their larger rivals walked upright, with their legs held underneath them, unlike modern reptiles. But like reptiles and birds, they had scaly skin and laid eggs.

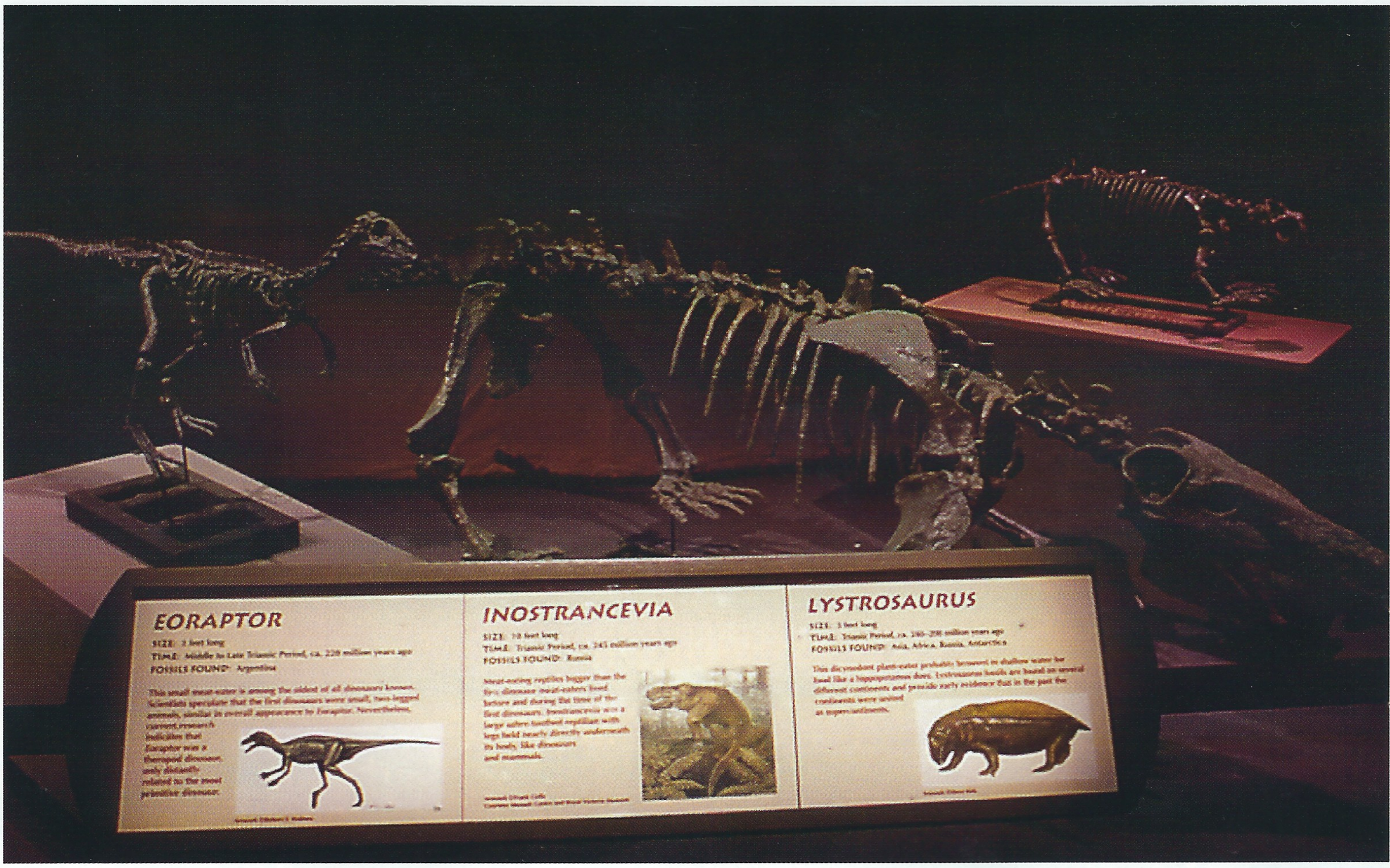
Dinosaurs and other animals were widespread across this warm and monsoon swept land. Ferns and palm like cycads were dominant plants. There were no flowers, bees or trees that dropped their leaves.



THE TRIASSIC WORLD

The earth's lands were a single giant continent when dinosaurs first appeared. Called Pangea, this land mass was already beginning to split into northern and southern super-continents.

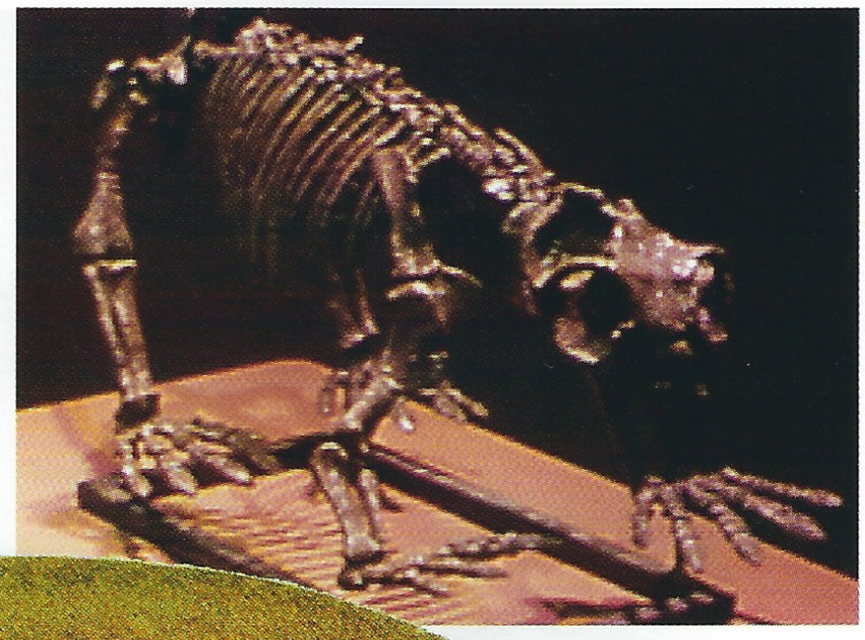
The first reptiles took to the air and the sea at this time. Most of the giant reptiles of the land, excepting dinosaurs, became extinct at the end of this era — an extinction event even greater than the one which wiped out the dinosaurs 135 million years later. Changes in temperatures caused by the spreading seas may have been a cause of this great dying.



BIG REPTILES OF THE TRIASSIC

LYSTROSAURS

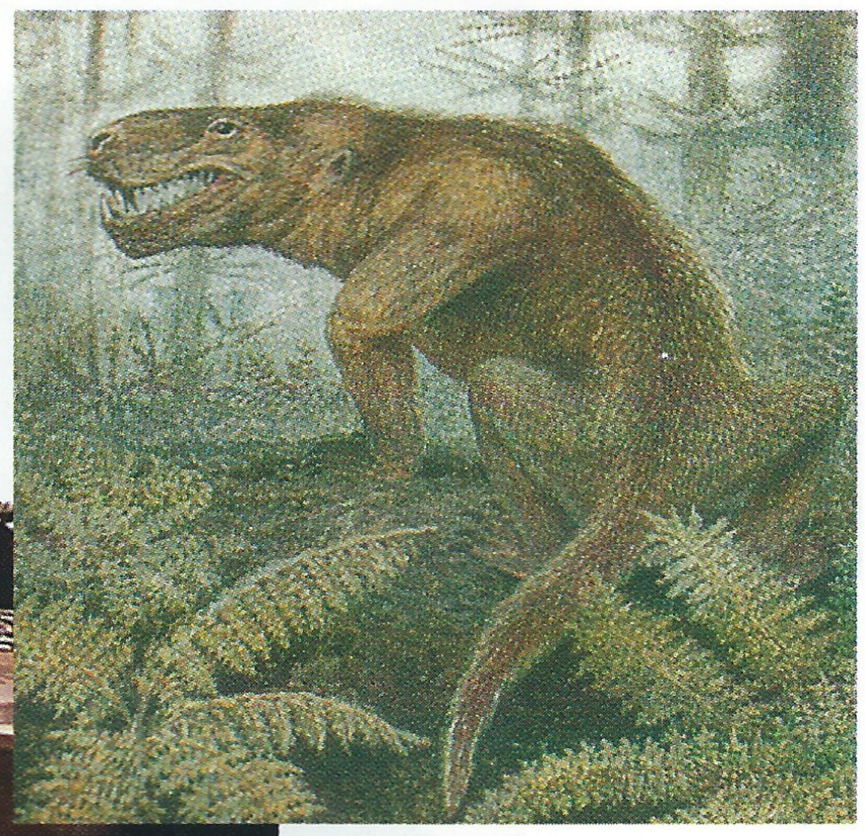
The most abundant plant-eater in the time of dinosaurs were dicynodonts. These pig-like plant-eaters were primitive ancestors of mammals. They chewed with two huge tusks, which gave them their name. Dicynodonts appeared early in the Triassic Period before dinosaurs. They lived throughout the Triassic Period, even after large dinosaur plant-eaters appeared.

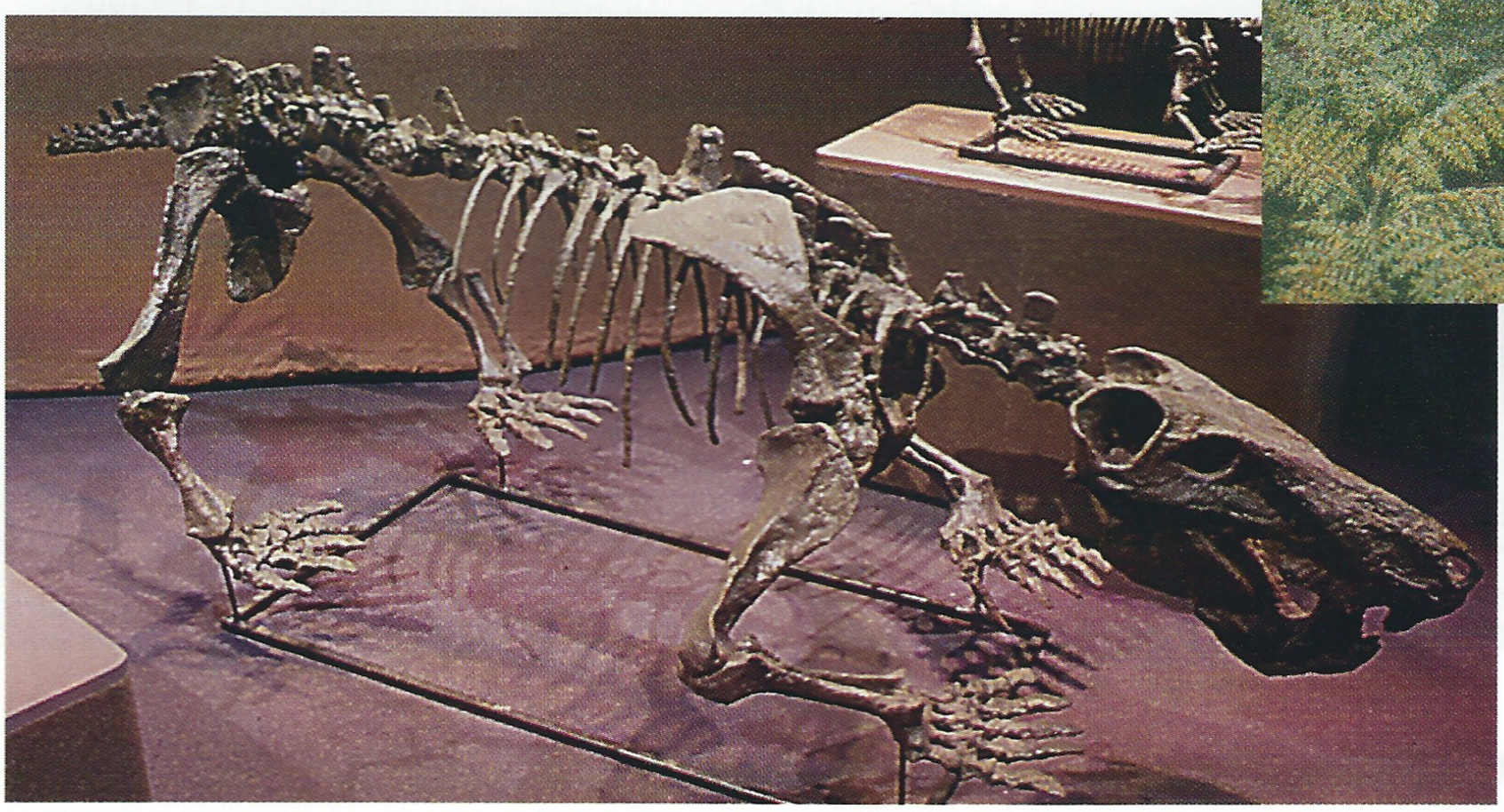


SIZE: 3 feet long.
TIME: Triassic Period,
ca. 240–200 million years ago
FOSSILS FOUND: Asia,
Africa, Russia, Antarctica

INOSTRANCEVIA

Meat-eating reptiles larger than the first dinosaurs ruled the Triassic world. Inostrancevia was one, a hunter equipped with sabre teeth. It walked nearly upright, like dinosaurs, and unlike modern splay legged reptiles.



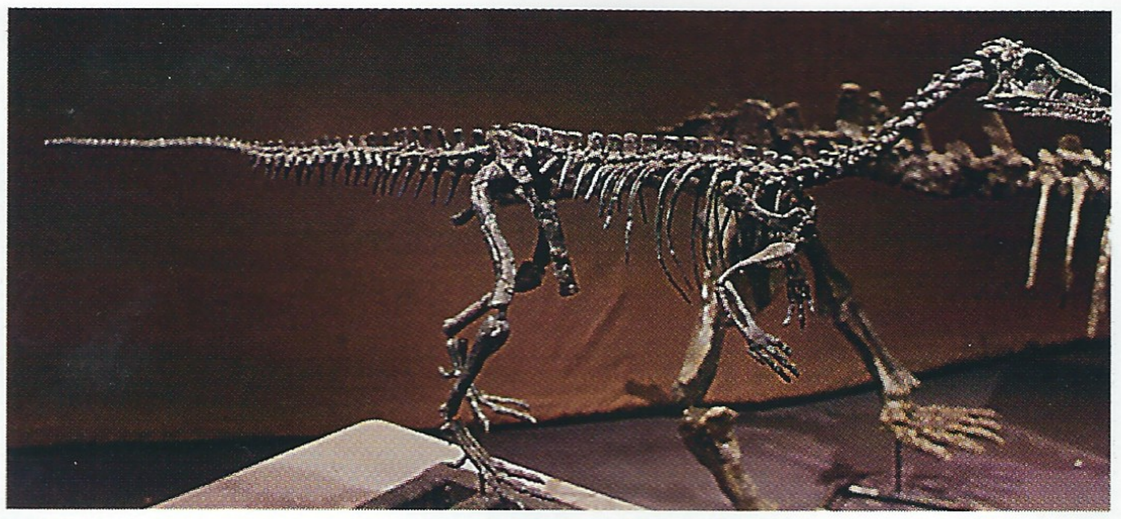


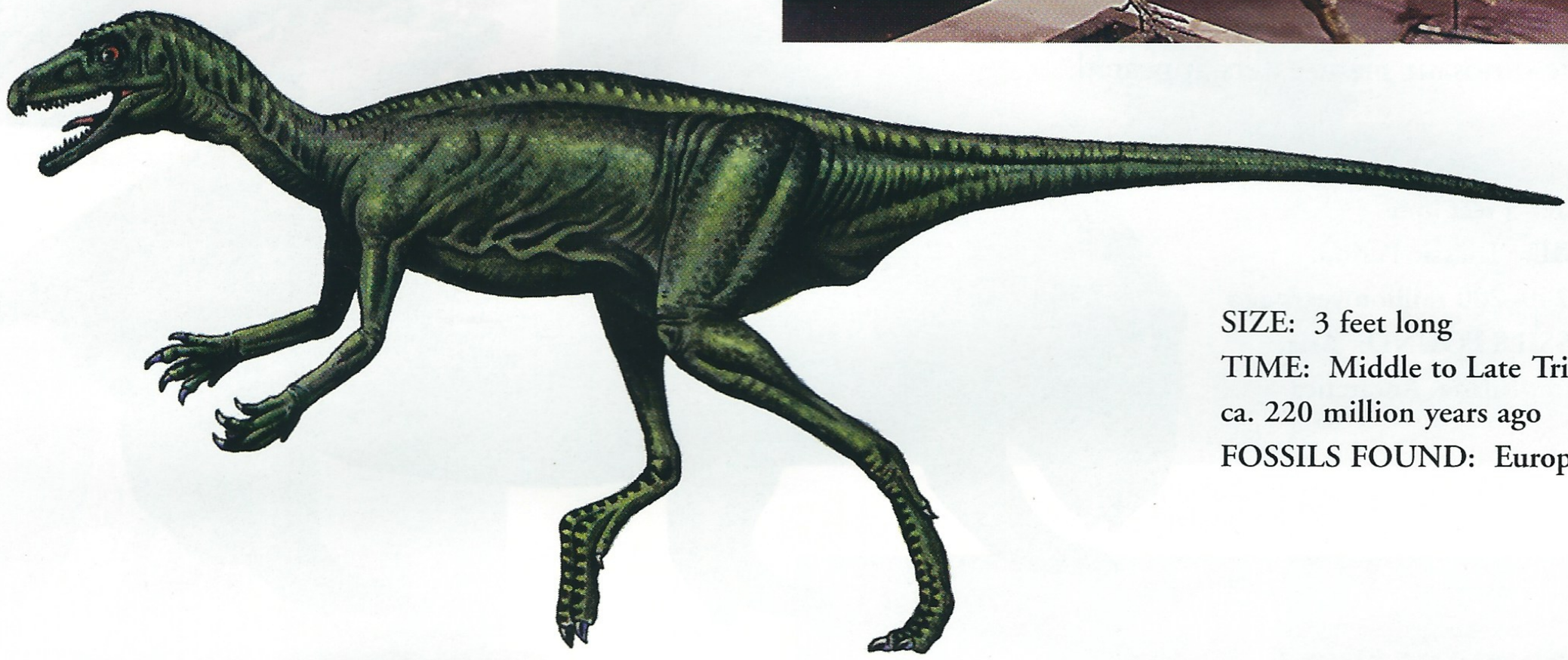
SIZE: 10 feet long
TIME: Triassic,
ca. 245 million years ago
FOSSILS FOUND: Russia

EARLY MEAT-EATERS

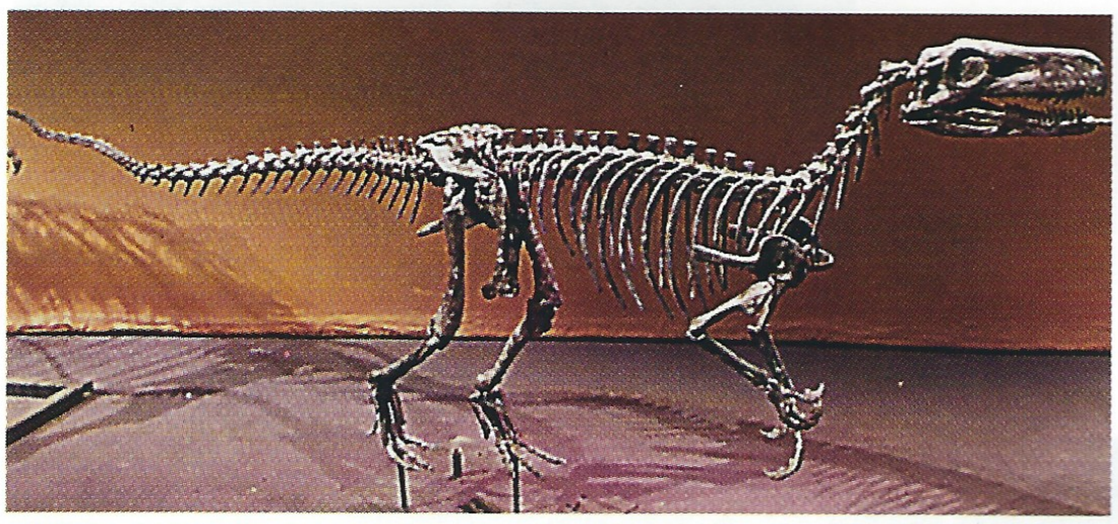
EORAPTOR

The dawn hunter is one of the first dinosaurs known, recently discovered in Argentina. No bigger than a large poodle, it ran on two legs. With sharp teeth and long fingers it nabbed prey including perhaps the earliest mouse-sized mammals.



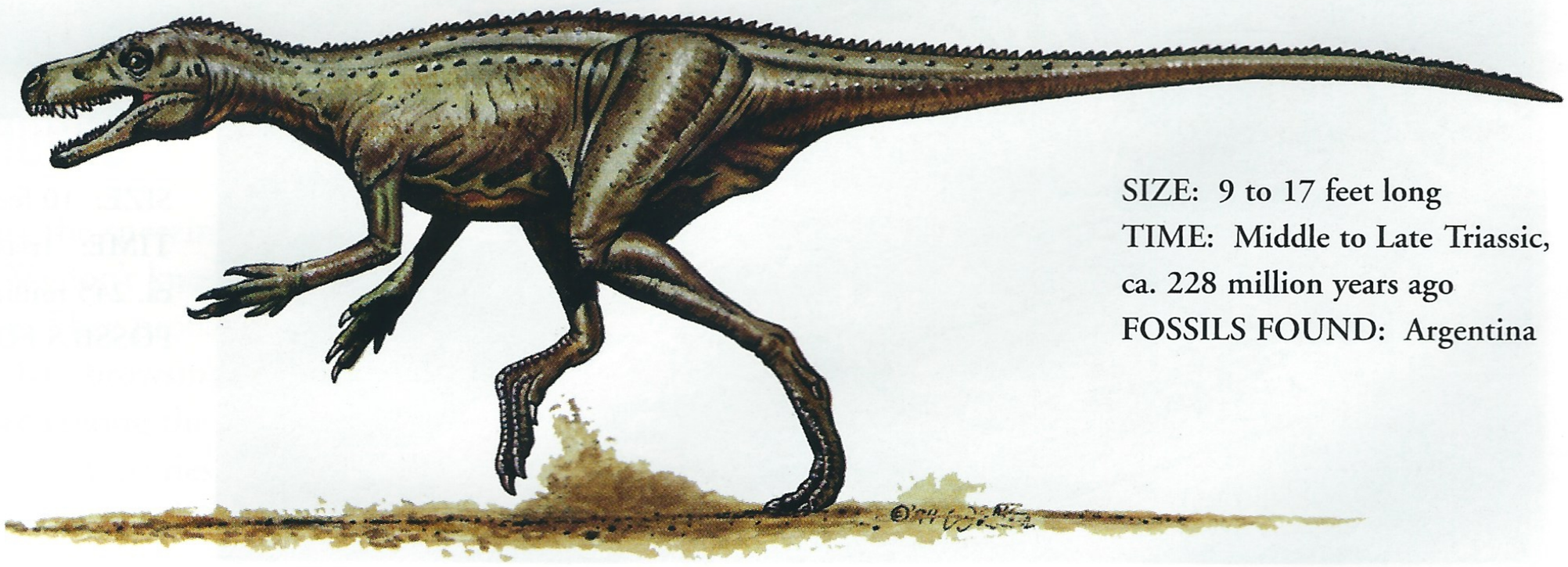


SIZE: 3 feet long
TIME: Middle to Late Triassic, ca. 220 million years ago
FOSSILS FOUND: Europe



HERRERASAURUS

Largest of the early meat-eaters but still less than 17 feet long, was this meat-eater known best from north-western Argentina. Its toothy jaw was hinged in the middle to help it open wide for large bites of flesh. Like all theropod, or meat-eating dinosaurs, including their descendants the birds, Herrerasaurus had three large toes on its feet.

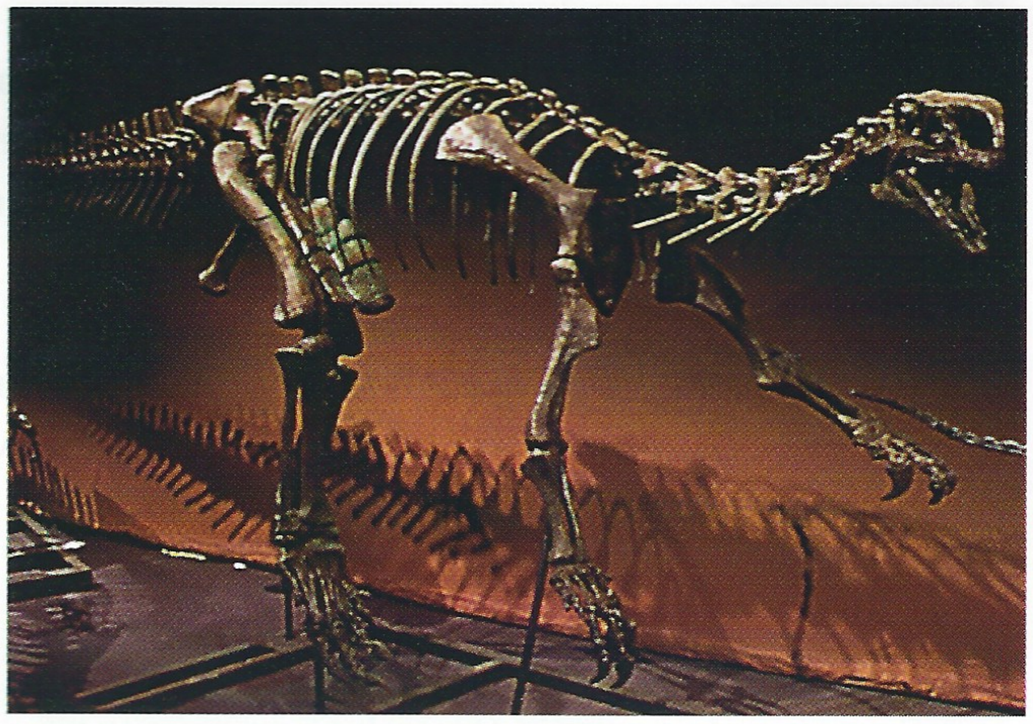


SIZE: 9 to 17 feet long
TIME: Middle to Late Triassic, ca. 228 million years ago
FOSSILS FOUND: Argentina

BIG EARLY DINOSAURS

PLATEOSAURUS

The first large dinosaur plant-eaters were plateosaurs. With tiny heads and bulky bodies, they grew to nearly 30 feet long and have been found from South Africa to Switzerland. Plateosaurs were capable of running on their hind legs or walking on all fours. They belong to the same dinosaur group as meat-eaters and giant plant-eaters, the lizard-hipped saurischians. Small plant-eaters of the second dinosaur group, the bird hipped ornithischians, also appeared in the Late Triassic. As the names suggest, dinosaurs are divided into these two groups according to the positioning of their hip bones.

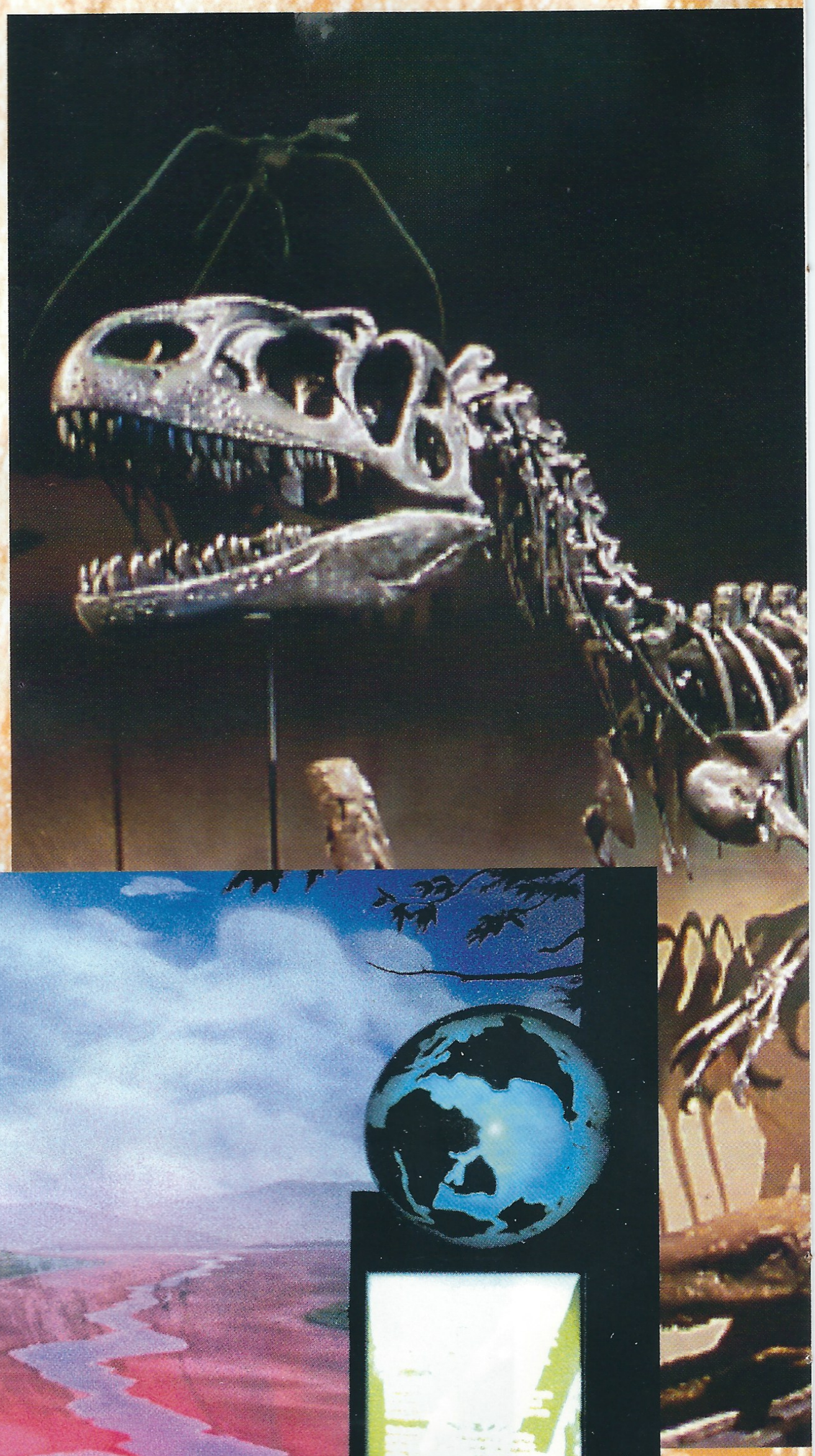


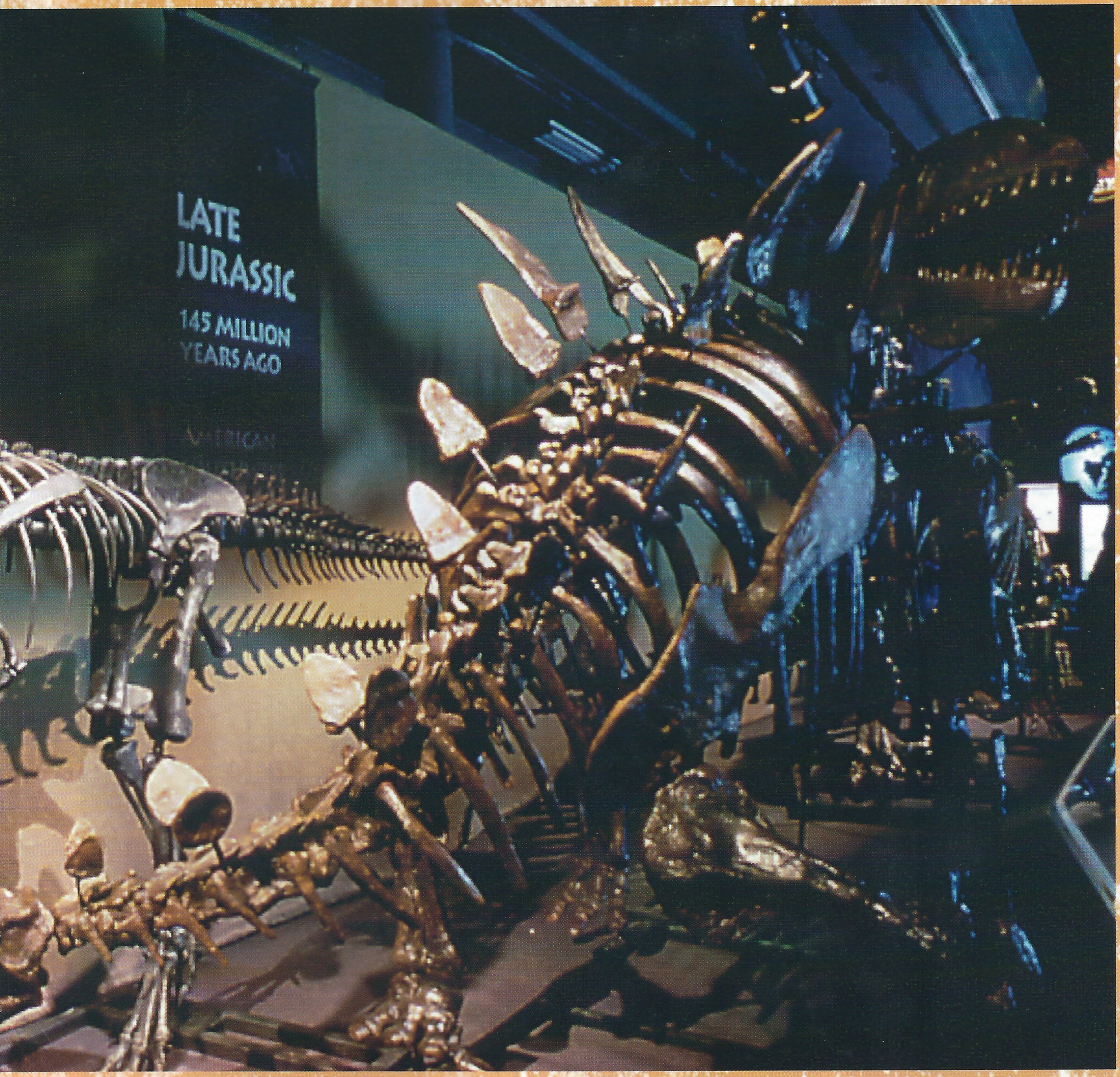
SIZE: 27 feet long
TIME: Late Triassic, ca. 220 million years ago
FOSSILS FOUND: Europe

THE JURASSIC PERIOD — THE GIANTS EMERGE

200 million to 145 million years ago

Dinosaurs became the dominant land animals in the Jurassic Period. In a dividing world of evergreens and ferns and cycads, they spread into a wide array of creatures, some as small as chickens, others as large as buildings. Prosauropods like Plateosaurus were replaced by up to six-story high sauropods, the four-legged plant-eating titans. Dilophosaurus was followed by ever larger meat-eaters including the Late Cretaceous king, Allosaurus, up to 40 feet long.




LATE
JURASSIC
145 MILLION
YEARS AGO

THE JURASSIC WORLD

The separation of the earth's land into two supercontinents was completed in the Jurassic. Two warm equatorial lands appeared -- Laurasia in the north, and Gondwana in the south. Today's continents of Antarctica and Australia, and even the country of India were linked to what is now Africa and South America as part of Gondwana. Though many dinosaur forms were found worldwide, different animals, including dinosaurs, began to appear in the two separating land masses.

DENIZENS OF THE JURASSIC WORLD

DILOPHOSAURUS

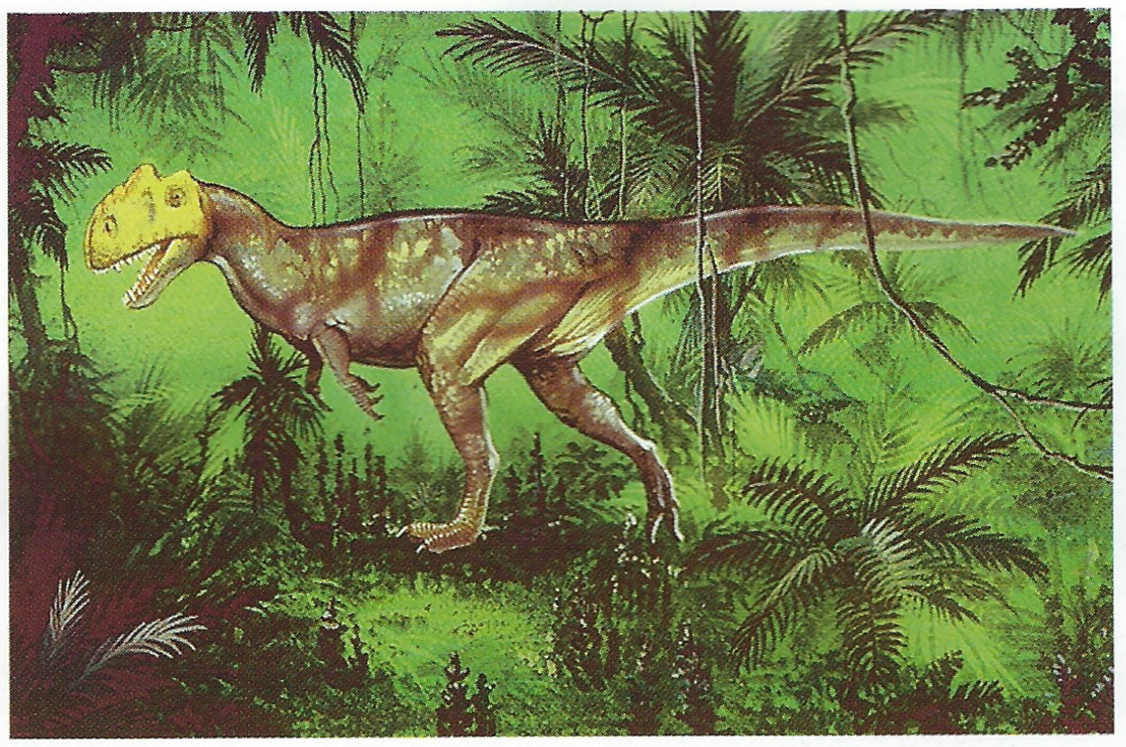
The little "spitter" of Jurassic Park wasn't poisonous or frilled in real-life. Nor was it tiny. Dilophosaurus was the first giant meat-eater from the Late Triassic or more likely the Early Jurassic Period. The Dilophosaurus known from the American Southwest reached 20 feet in length. But new specimens such as the one displayed for the first time in North America in this exhibit are nearly 30 feet long! They're named for their odd double head crest.

SIZE: 20 feet to 30 feet long
TIME: Late Triassic, Early Jurassic, ca. 200 million years ago
FOSSILS FOUND: American West, China

MONOLOPHOSAURUS

Monolophosaurus is also known from China in the Middle Jurassic and may have preyed upon Bellusaurus. It was discovered less than 15 years ago, with the best known specimen excavated by a team of Chinese and Canadian paleontologists in northwestern China.

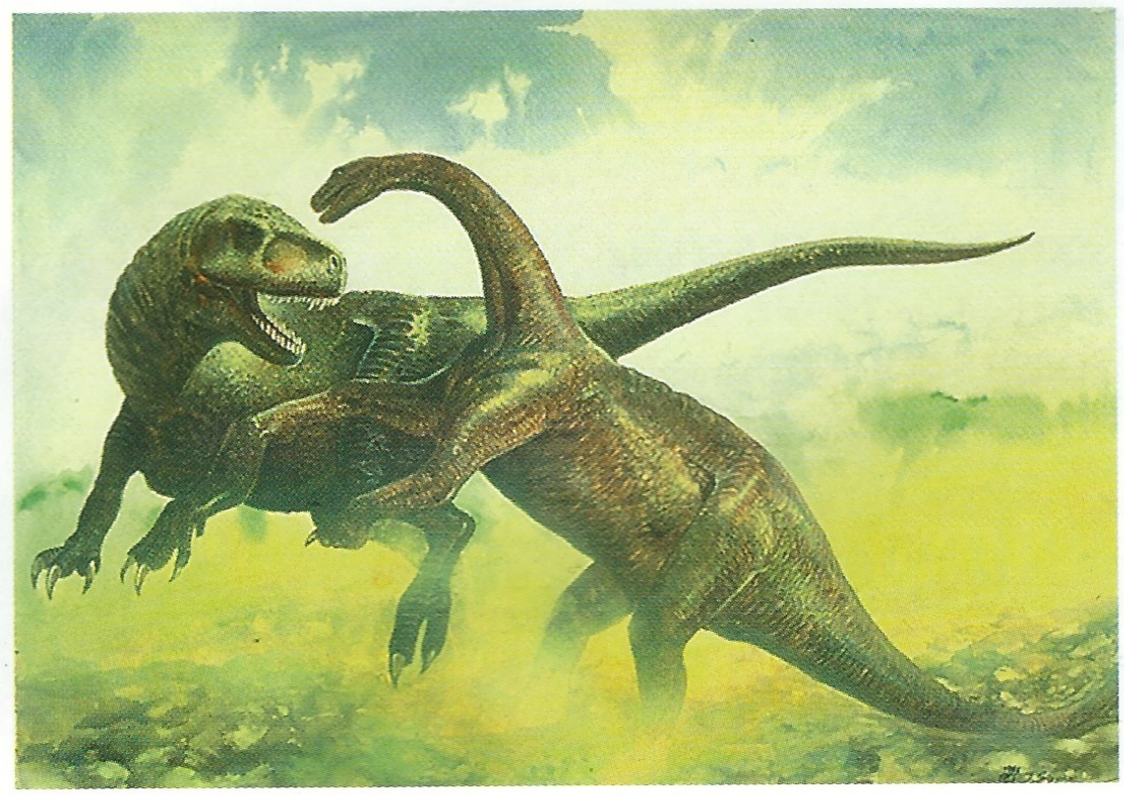
SIZE: 16 feet long
TIME: Middle Late Jurassic, ca. 170 million years ago
FOSSILS FOUND: China



BELLUSAURUS

This Chinese dinosaur from midway in the Jurassic was an ancestor of the truly giant plant-eaters. Like later and larger four-legged herbivores, Bellusaurus was a sauropod. Sauropods had tiny heads and weak teeth. Many relied on stomach stones to help them grind their food.

SIZE: 16 feet long
TIME: Middle Jurassic, ca. 188–163 million years ago
FOSSILS FOUND: China



YANGCHUANOSAURUS

A huge and heavily built meat-eater, Yanchuanosaurus belongs to a little understood group of early large meat-eaters, the megalosaurids.

SIZE: 25 feet to 33 feet long
TIME: Late Jurassic, ca. 163–145 million years ago
FOSSILS FOUND: China

TUOJIANGOSAURUS

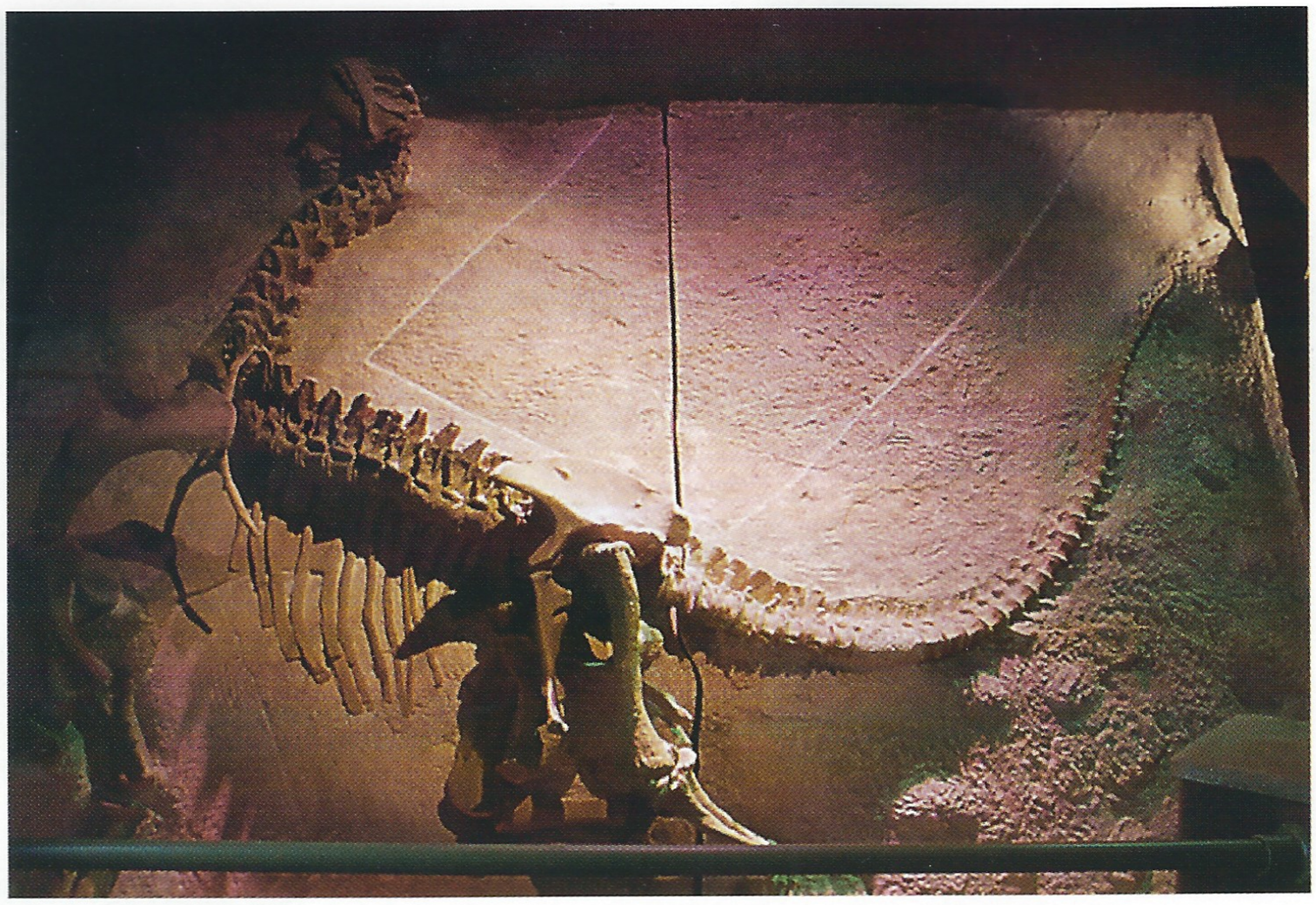
The earliest stegosaurs are spike-backed plant-eaters known from China. This relative of the larger, plate-backed Stegosaurus of North America lived nearly 20 million years before Stegosaurus. All stegosaurs had tiny brains. The lump of fatty nervous tissue in their rear ends is not a second brain.

SIZE: 22 feet long
TIME: Middle Late Jurassic, ca. 163 million years ago
FOSSILS FOUND: China

THE JURASSIC WORLD

CAMARASAURUS

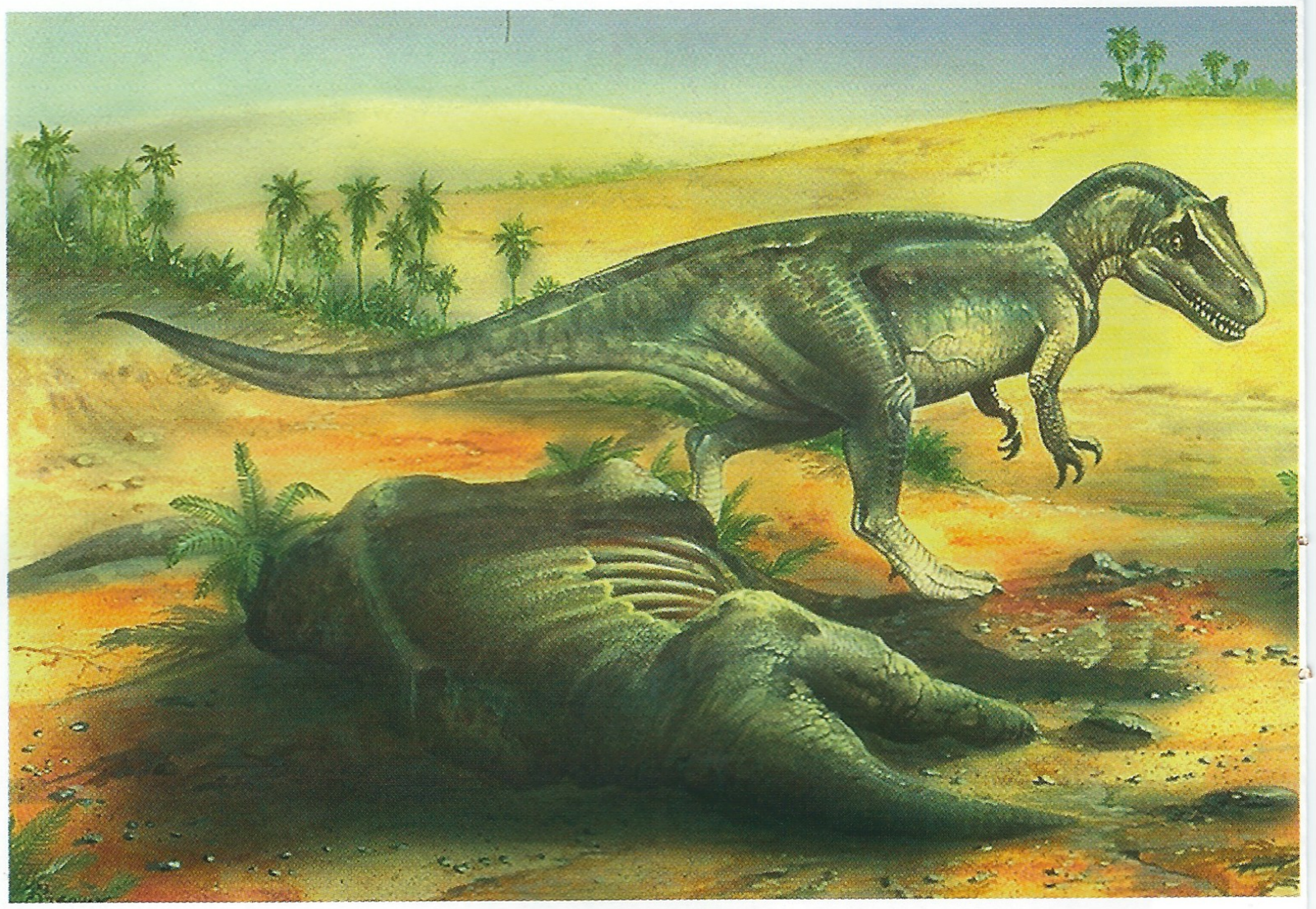
There are many giant plant-eaters known from the Late Jurassic American West, including Apatosaurus (wrongly called Brontosaurus), Brachiosaurus and Barosaurus. But Camarasaurus was the most common. This specimen is cast from perhaps the most complete of all the sauropod skeletons found in the West. This youngster is positioned just as it died and was buried, with its head and tail curled back by muscles which constrict just after death.



SIZE: 60 feet long
TIME: Late Jurassic, ca. 145 million years ago
FOSSILS FOUND: North American West

ALLOSAURUS

Allosaurus was the largest and most common meat-eater of the Late Jurassic American West. This individual is cast from the bones of an unusually well-preserved juvenile. As adults, allosaurs grew nearly twice as large. Allosaurus was not closely related to T. rex — which is closer in time to us than Allosaurus. T. rex had two fingers on stubby hands. Allosaurus had three fingers set on longer, powerful arms.



SIZE: 30 to 40 feet long
TIME: Late Jurassic, ca. 145 million years ago
FOSSILS FOUND: American West

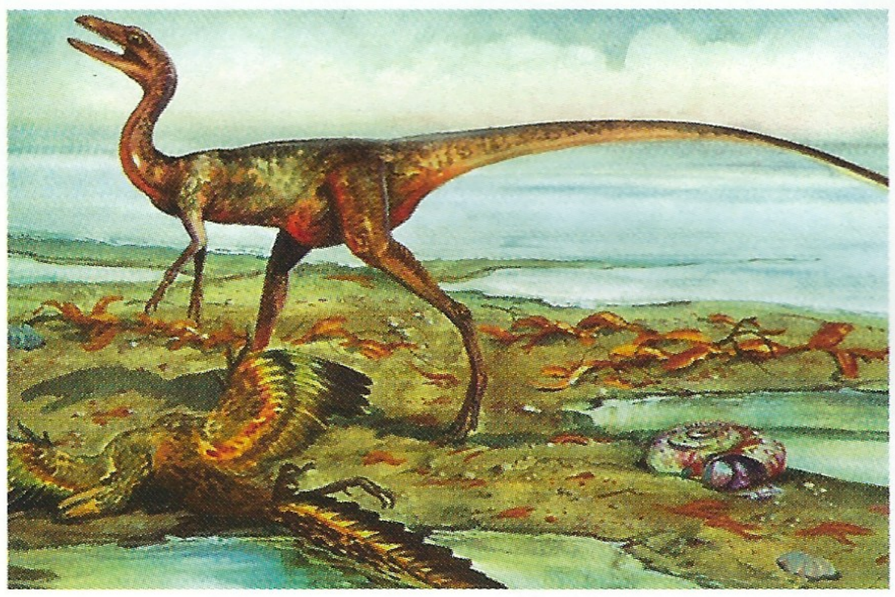
ARCHAEOPTERYX

Archaeopteryx is the earliest known bird. Birds are descended from small meat-eating or theropod dinosaurs like Compsognathus. Both animals are spectacularly preserved as fossils in the limestones of Eichstatt, Germany. Archaeopteryx looks so much like Compsognathus that a specimen of Archaeopteryx was mistaken for Compsognathus until its faint feather impressions were identified.

SIZE: 1 foot wide

TIME: Late Jurassic, ca. 145 million years ago

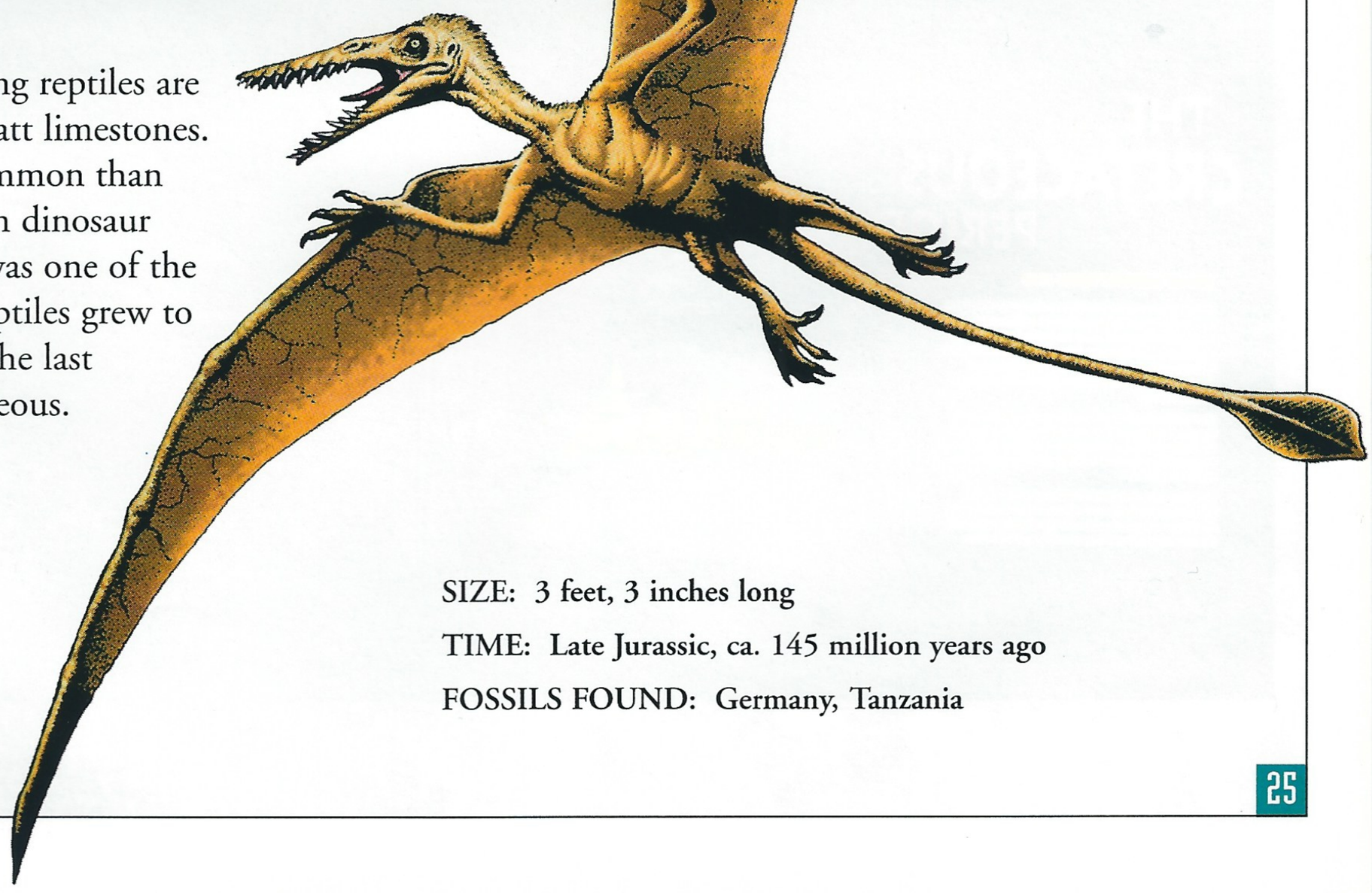
FOSSILS FOUND: Germany



Compsognathus

RHAMPHORHYNCHUS

The straw-thin bones of flying reptiles are also well-preserved in Eichstatt limestones. Pterosaurs were far more common than birds, judging from fossils, in dinosaur times. Rhamphorhynchus was one of the smaller pterosaurs. Flying reptiles grew to the size of fighter planes in the last dinosaur period, The Cretaceous.



SIZE: 3 feet, 3 inches long

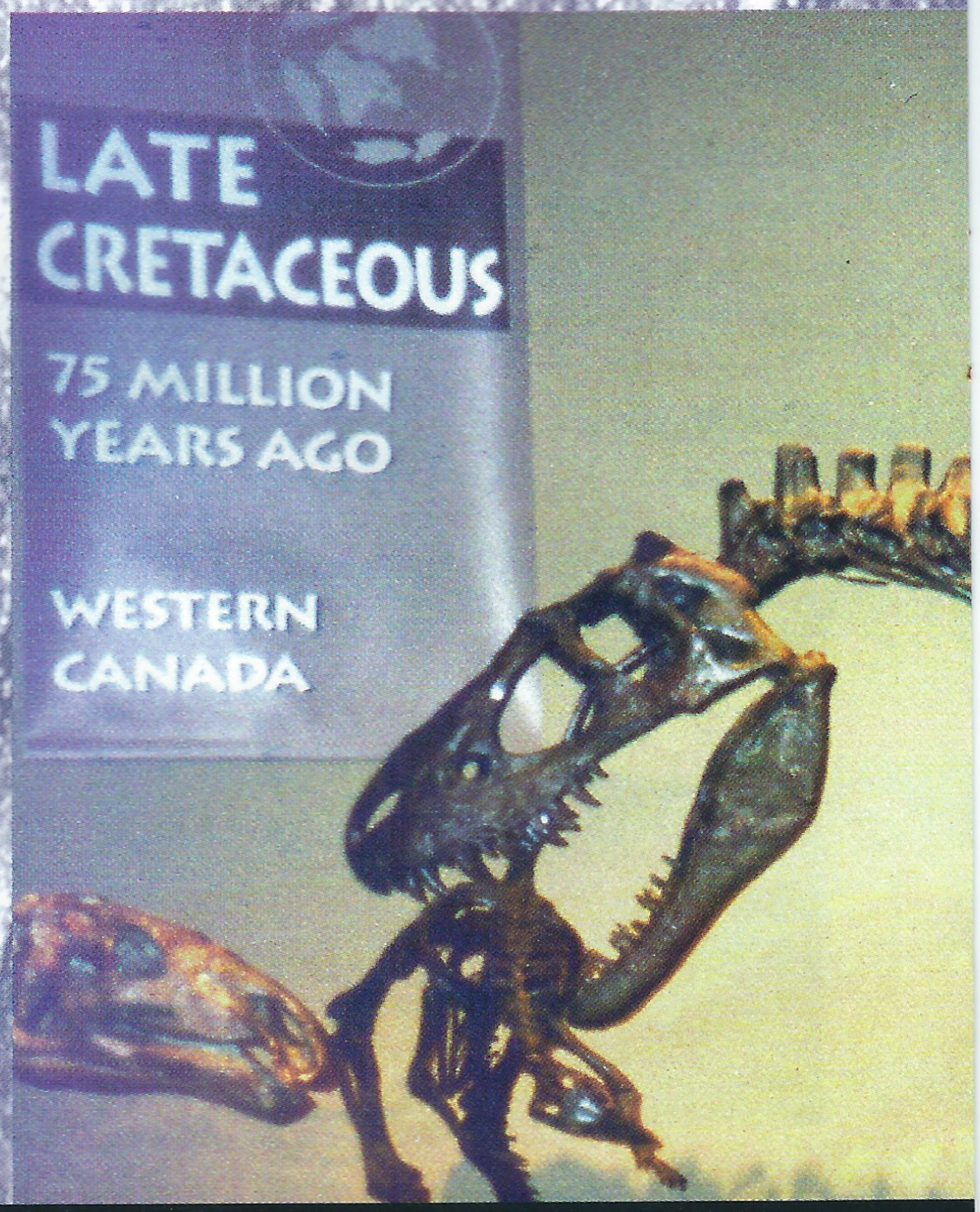
TIME: Late Jurassic, ca. 145 million years ago

FOSSILS FOUND: Germany, Tanzania

THE CRETACEOUS PERIOD

145 million to 65 million years ago

The biggest, the brainiest, the fastest and the nastiest dinosaurs appeared in this, the last dinosaur period. Horned dinosaurs ranged across western North America. "Raptor" dromaeosaurids, some of them gigantic, turned up in Asia and North America and similar creatures are lately being found in southern continents. Iguanodontids and duckbilled dinosaurs became common plant-eaters worldwide, as vegetation changed. The first flowering plants and trees appeared in the Cretaceous as did many modern insects.



EARLY
CRETACEOUS
100 MILLION
YEARS AGO
ARGENTINA

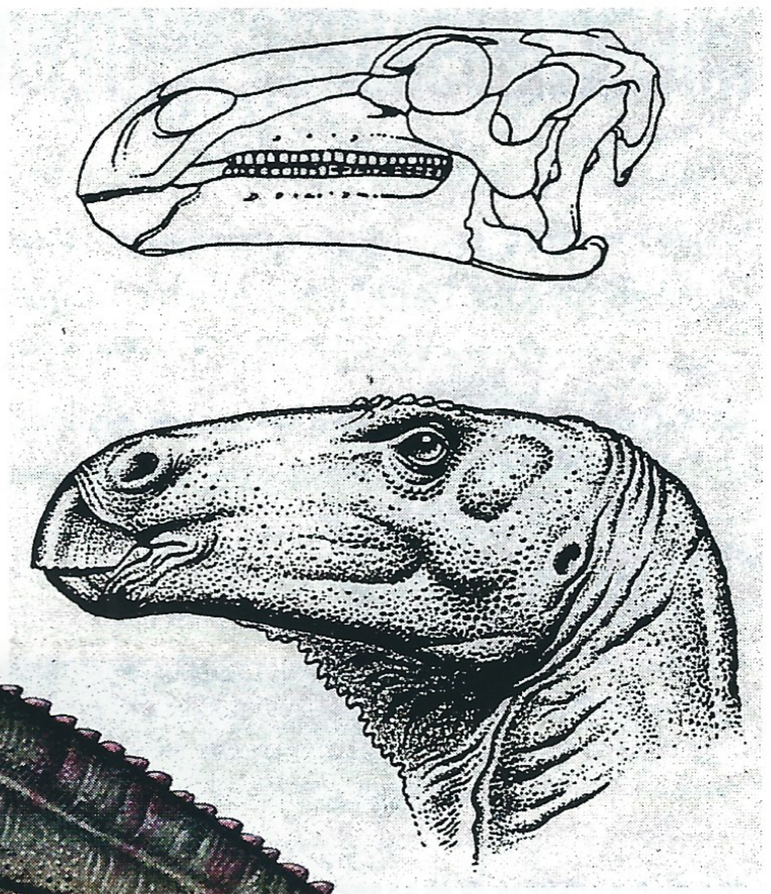
CRETACEOUS TIME LINE

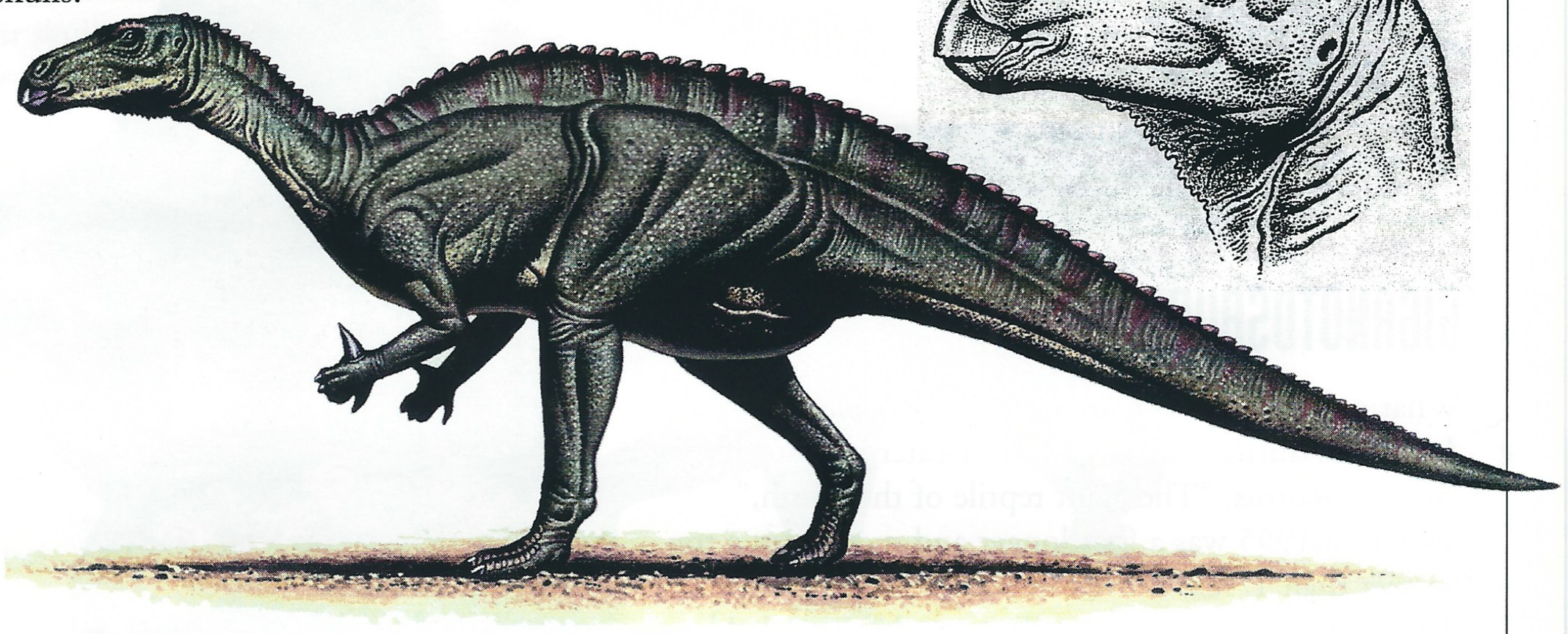
The continents took on forms much like today's in the Cretaceous Period. Enormous changes made that possible. Australia split from Antartica but remained with the Antarctic Circle. India drifted from Africa northward to crash into Asia, forming the Himalayas. Seas swelled to their highest levels ever midway through the Cretaceous Period. A huge, shallow seaway ran north to south through North America until late in the Cretaceous.

CRETACEOUS

IGUANODON

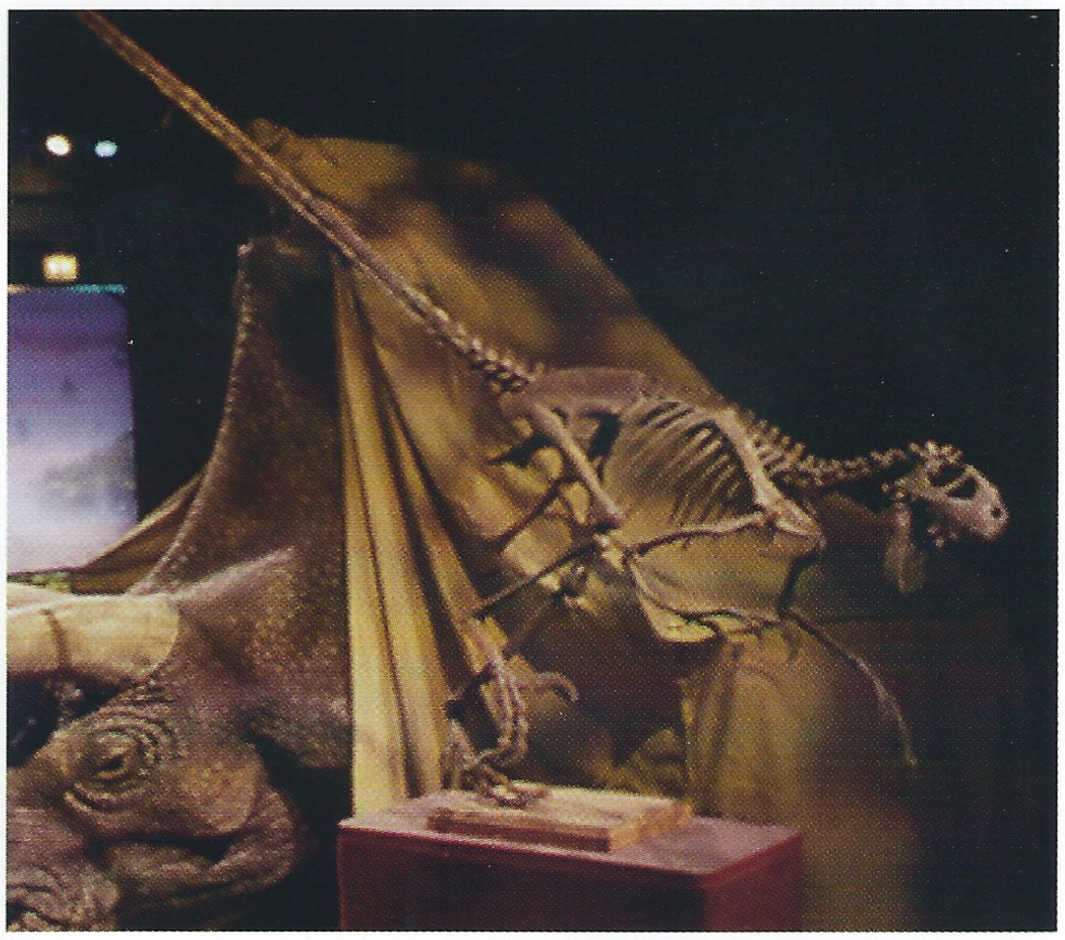
Iguanodon was the first dinosaur named and one of the most common and widely found. It is known in various forms from Australia to North America, Europe to this Asian specimen. These plant-eaters had huge thumb spikes originally thought to have stuck out of their skulls.

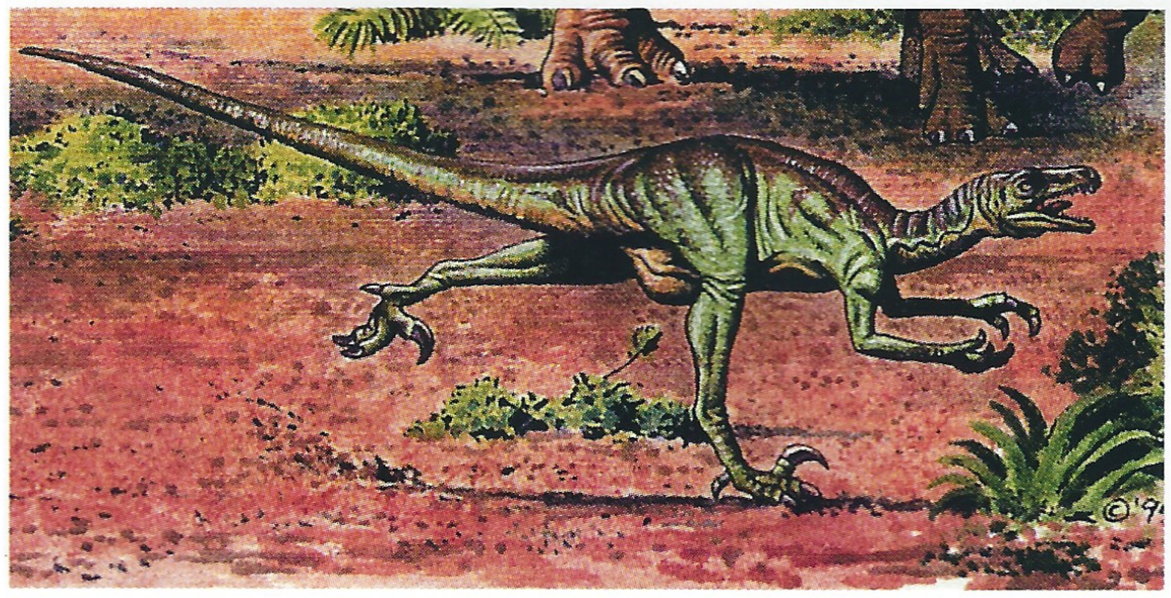




DROMAEOSAURUS

The deadly "raptor" dinosaurs, with their huge hand and toe claws, first appeared early in the Cretaceous. Dromaeosaurus, from North America, was one of the last and smallest, along with Velociraptor from Asia. No raptors were as smart or fast as depicted in Jurassic Park. But the first "raptors," only recently discovered, were far larger than in the film — perhaps 20 feet long. Unlike many dinosaurs, they grew smaller in size as a group over time.



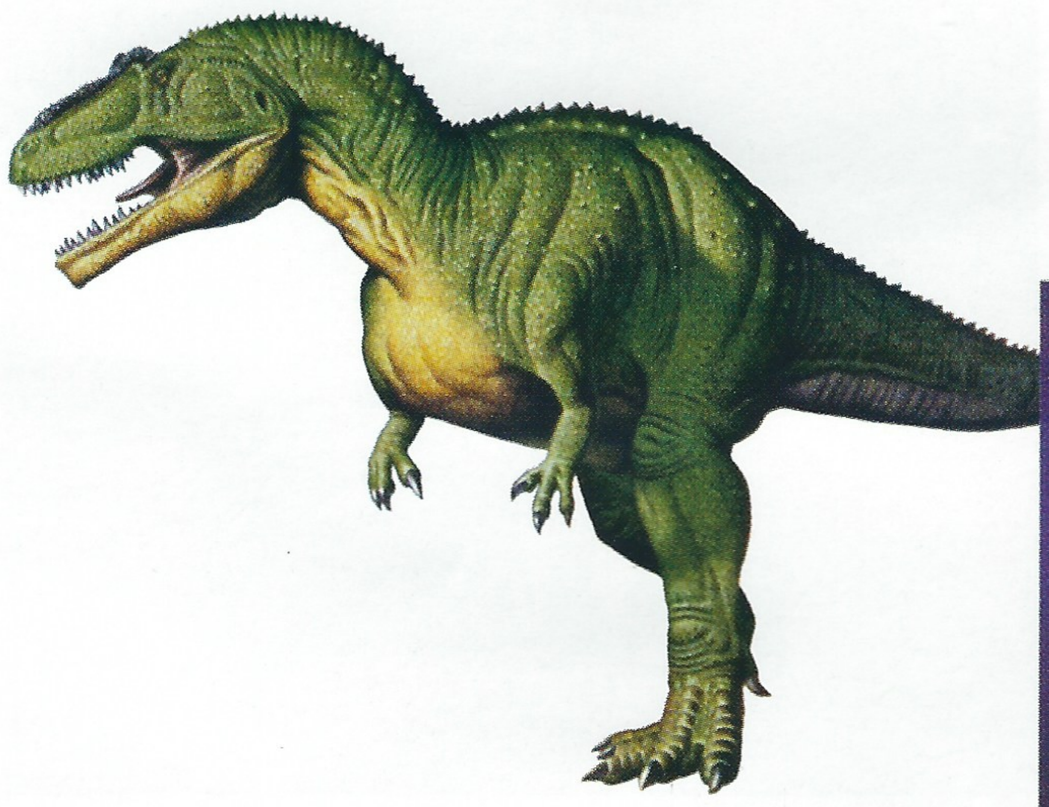


ARGENTINOSAURUS VERTEBRA

This cast is made from the largest fossil bone in the world —five feet high and more than 4 feet wide. It belongs to the backbone of the largest animal which ever walked the Earth. No dinosaur was larger than this bulky plant-eater, which weighed as much as 50 elephants. Few were longer, as it stretched to more than 100 feet long.

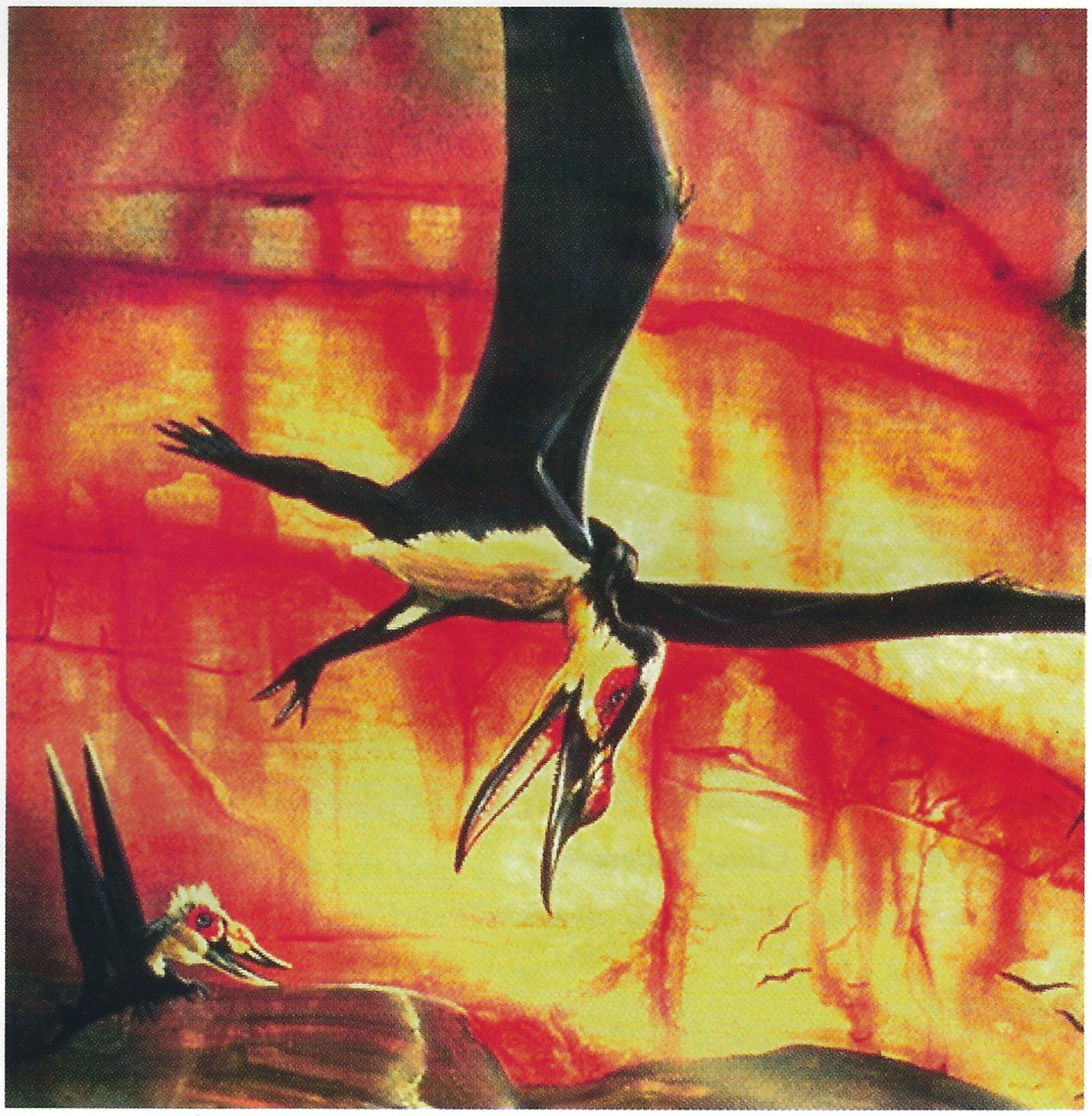
GIGANOTOSAURUS

What could have eaten an animal as large as Argentinosaurus? The largest meat-eater in history, Giganotosaurus. "The giant reptile of the South," named in 1995 was a foot longer and more than a ton heavier than T. rex. It lived in South America more than 30 million years before T. rex and was probably descended from relatives of Allosaurus of Late Jurassic North America.



DSUNGARIPTERUS

This peculiar flying reptile may have lived on shellfish crushed in its narrow, toothy jaws. Some pterosaurs in the Cretaceous grew large crests and short tails without the diamond-shaped rudders of the earlier rhamphorynchids. Some flying reptiles were truly enormous — four times as wide as Dsungaripterus.



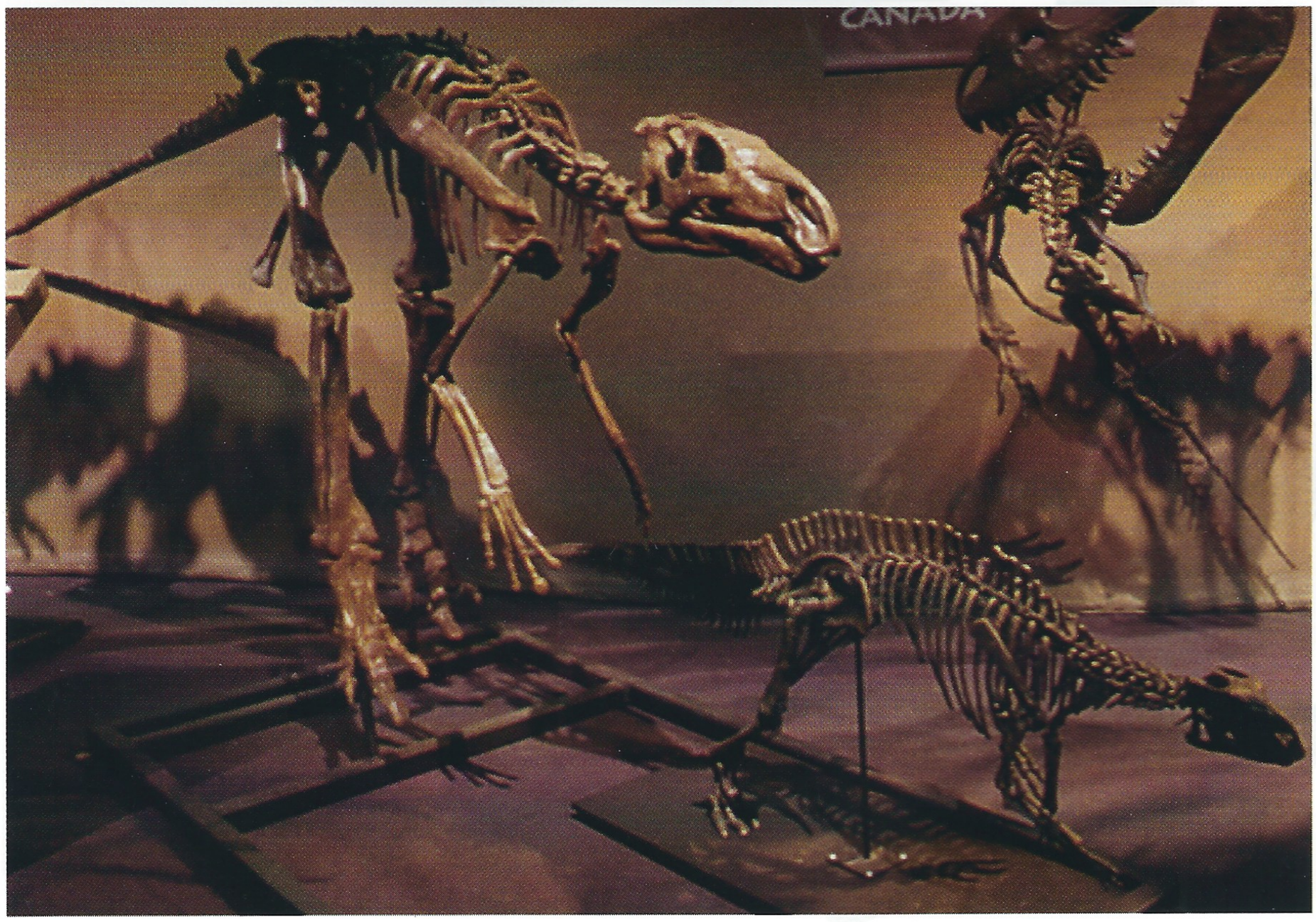
SIZE: 10 feet wide
TIME: Late Jurassic, Early Cretaceous, ca. 156–113 million years ago
FOSSILS FOUND: Africa, China

Pteranodon, a Cretaceous Pterosaur with a wing span of 27 feet

PROBACTROSAURUS

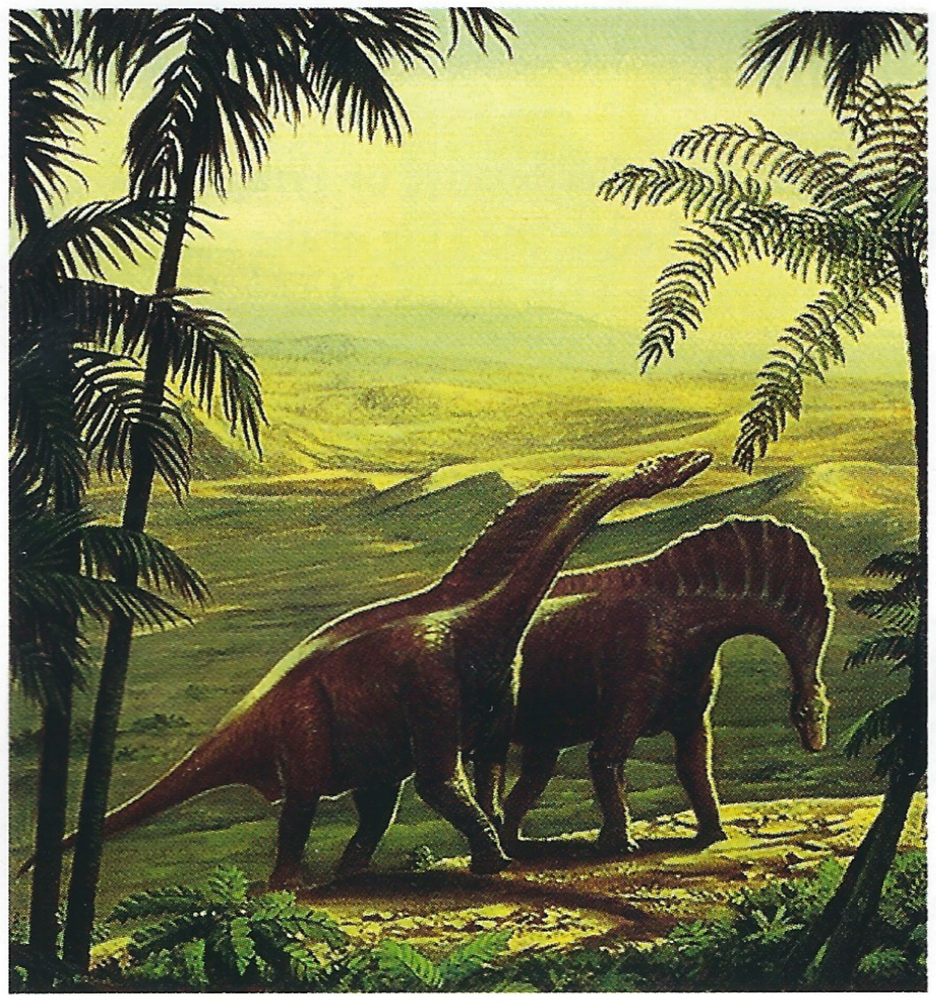
These plant-eating dinosaurs appear to be primitive duckbills and are found across Asia. What appears to be a parent and child here are from very different communities. The adult is cast from a dinosaur found in Mongolia by Russian paleontologists. The youngster comes from China.

SIZE: up to 17 feet long
TIME: Early Late Cretaceous, ca. 97-91 million years ago
FOSSILS FOUND: China, Mongolia



AMARGASAURUS

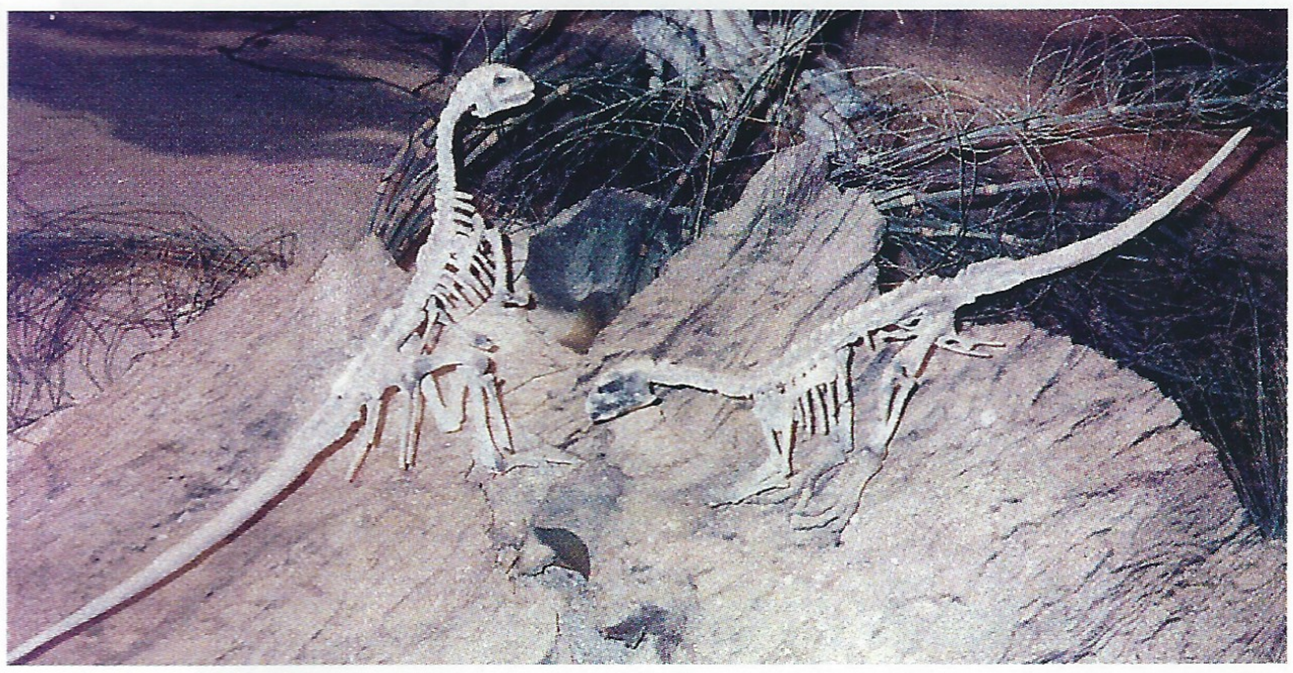
Among the most peculiar of all known sauropod dinosaurs is this Argentine plant-eater with a double mane of bone on its back. Whether these long spines were covered with skin or bare, and what purpose they might have served, is unknown. Amargasaurus has never before been exhibited in North America.



SIZE: 30 feet long
TIME: Early Late Cretaceous, ca. 130–115 million years ago
FOSSILS FOUND: Argentina

GASPARINISAURA

This tiny but probably full-grown plant-eating dinosaur is a primitive bird-hipped dinosaur, though it lived late in dinosaur time. Found recently in Argentina it was named in 1988 after a female researcher, making it one of only three dinosaurs with a female name (along with Laellynasaura and Maiasaura).



SIZE: 3 feet long
TIME: Early Cretaceous, ca. 70 million years ago
FOSSILS FOUND: Argentina

CRETACEOUS

ALBERTOSAURUS

Albertosaurus was an earlier relative of Tyrannosaurus rex, ten million years before the king of the dinosaurs arrived. Like all tyrannosaurs, Albertosaurus has only two fingers, and powerful jaws were its principal weapons.

SIZE: 25 feet to 30 feet long
TIME: Late Cretaceous, ca. 76-68 million years ago
FOSSILS FOUND: American West

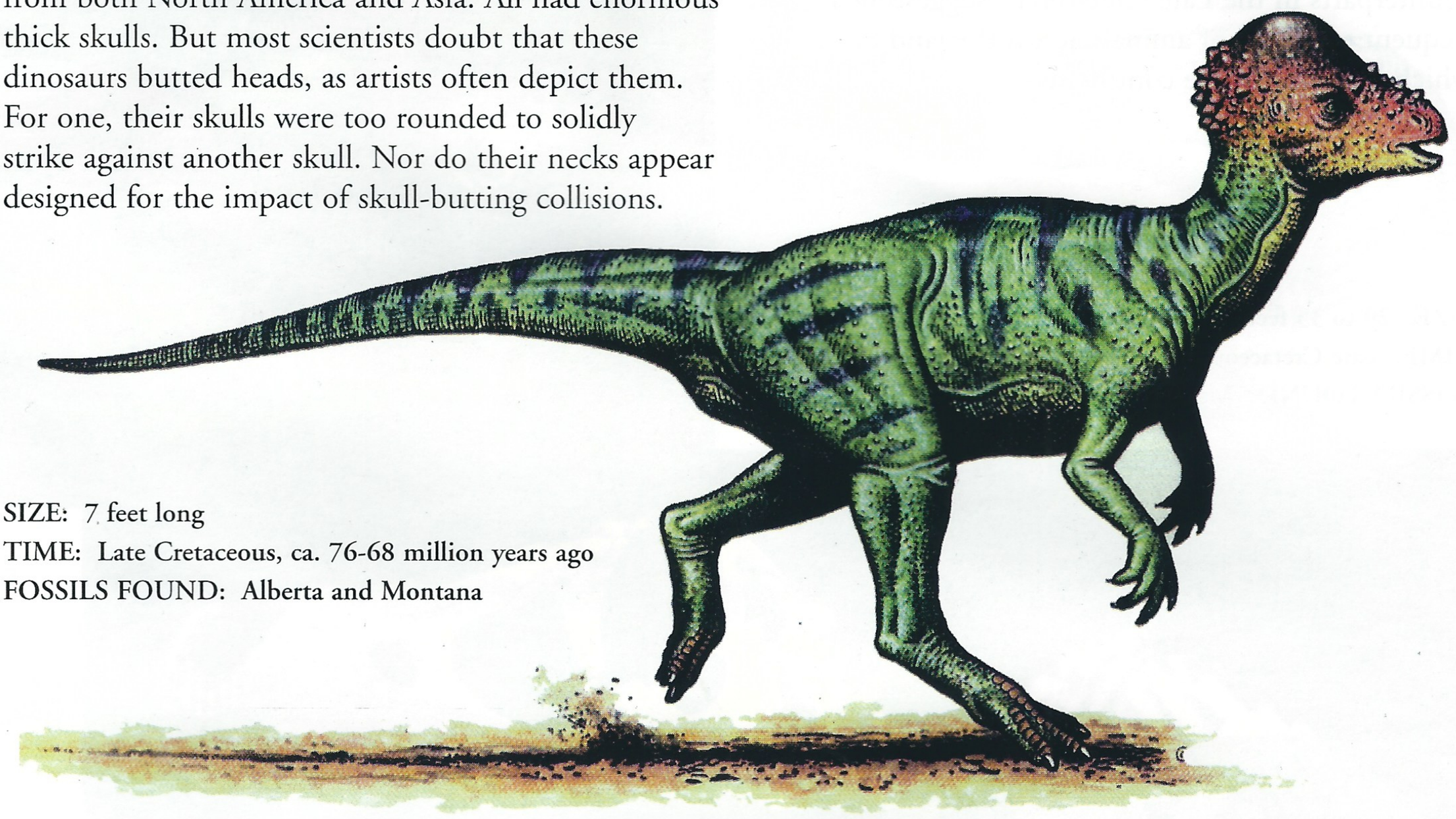
THESCELOSAURUS

Thescelosaurus was a plant-eating bird-hipped dinosaur of western North America from Albertosaurus's time. Whether it was ever eaten by Albertosaurus is unknown.

SIZE: 12 feet long
TIME: Late Cretaceous, ca. 76-68 million years ago
FOSSILS FOUND: North American West

STEGOCERAS

Dome-headed dinosaurs, like Stegoceras, were small in size, with few exceptions. Called pachycephalosaurs, many had heavily ornamented skulls. They are known from both North America and Asia. All had enormous thick skulls. But most scientists doubt that these dinosaurs butted heads, as artists often depict them. For one, their skulls were too rounded to solidly strike against another skull. Nor do their necks appear designed for the impact of skull-butting collisions.



SIZE: 7 feet long
TIME: Late Cretaceous, ca. 76-68 million years ago
FOSSILS FOUND: Alberta and Montana

STRUTHIOMIMUS

Struthiomimus was one of the fastest of all dinosaurs, the ornithimomids. The "ostrich mimic" Struthiomimus had long and slender legs and a light-weight body ideal for running fast. Though footprints fail to show any ornithomimid running more than 25 miles an hour, they may well have run faster. What these largely toothless descendants of meat-eating dinosaurs ate is a mystery.

SIZE: 11.5 feet long
TIME: Late Cretaceous, ca. 75-65 million years ago
FOSSILS FOUND: Alberta

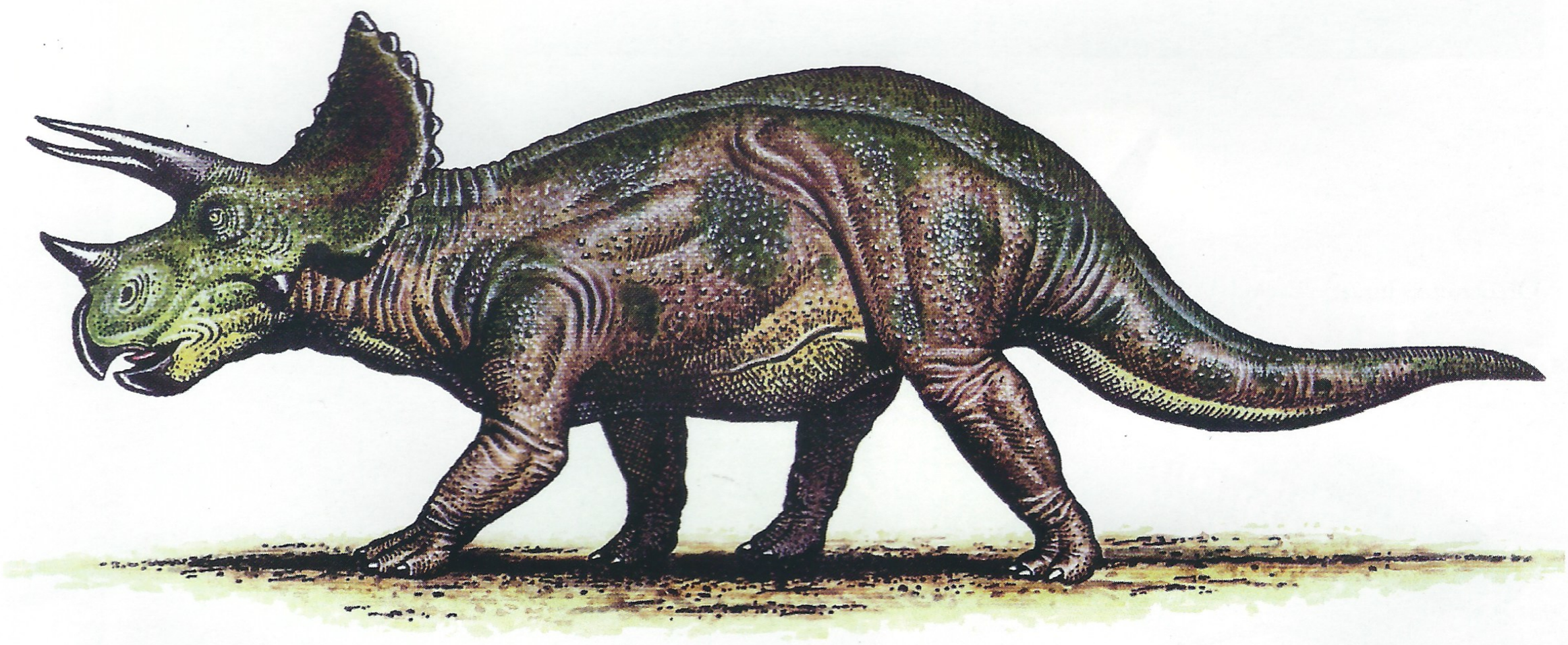
TARBOSAURUS

Tarbosaurus, also known as Tyrannosaurus bataar, was T. rex's nearly identical but slightly smaller Asian cousin. Many North American dinosaurs had Asian counterparts in the Late Cretaceous, suggesting a frequent exchange of animals across the land bridge which then linked the continents.

SIZE: 20 to 35 feet long
TIME: Late Cretaceous, ca. 70–65 million years ago
FOSSILS FOUND: Mongolia

TRICERATOPS

The biggest of all the horned dinosaurs was Triceratops. It was also one of the last of the horned dinosaurs, which appear to have lived only in North America, and to have perished at the end of the Cretaceous.



SIZE: 25 feet long

TIME: Late Cretaceous, ca. 65 million years ago

FOSSILS FOUND: American West

ALONGSIDE DINOSAURS

COELOCANTH

The Coelocanth, a fish twice as ancient as the dinosaurs, lived at the same time as Eosalmo, one of the bony fishes common throughout dinosaur time. Also common were lobe-finned fishes, now nearly extinct, including lungfish and the coelocanth.

A living Coelocanth

Oreochima. Jurassic period

Ray-finned fish

CATOPSALIS

Mammals like this Mongolian specimen lived throughout dinosaur time but never grew larger than house cats until the extinction of dinosaurs. The extinction of the dinosaurs helped make room for a mammal-dominated world, and for the emergence of humans. But recent evidence suggests mammals had begun to diversify shortly before the end of dinosaurs.

SIZE: Less than 1 foot long
TIME: Late Cretaceous, ca. 75 million years ago
FOSSILS FOUND: Western Canada

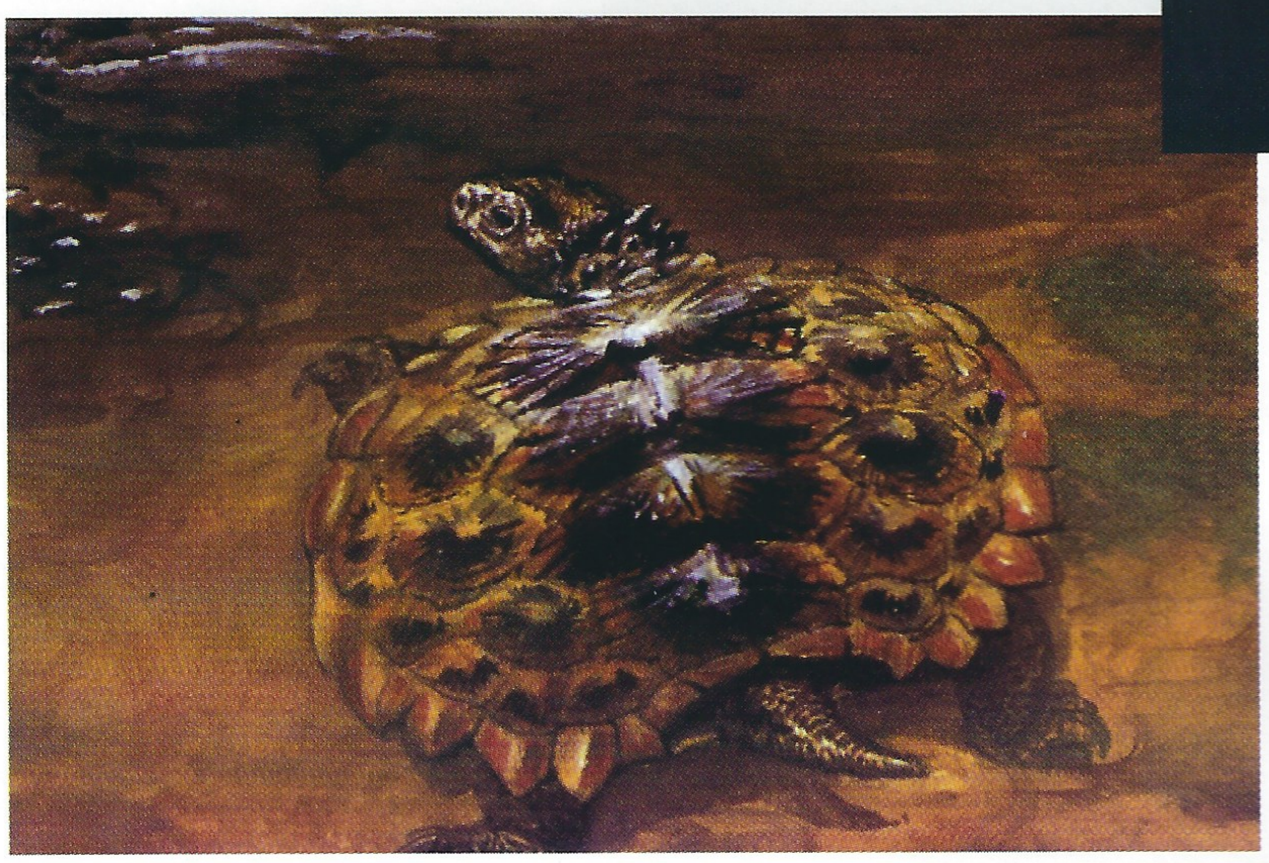
Megazostrodon

ALONGSIDE DINOSAURS

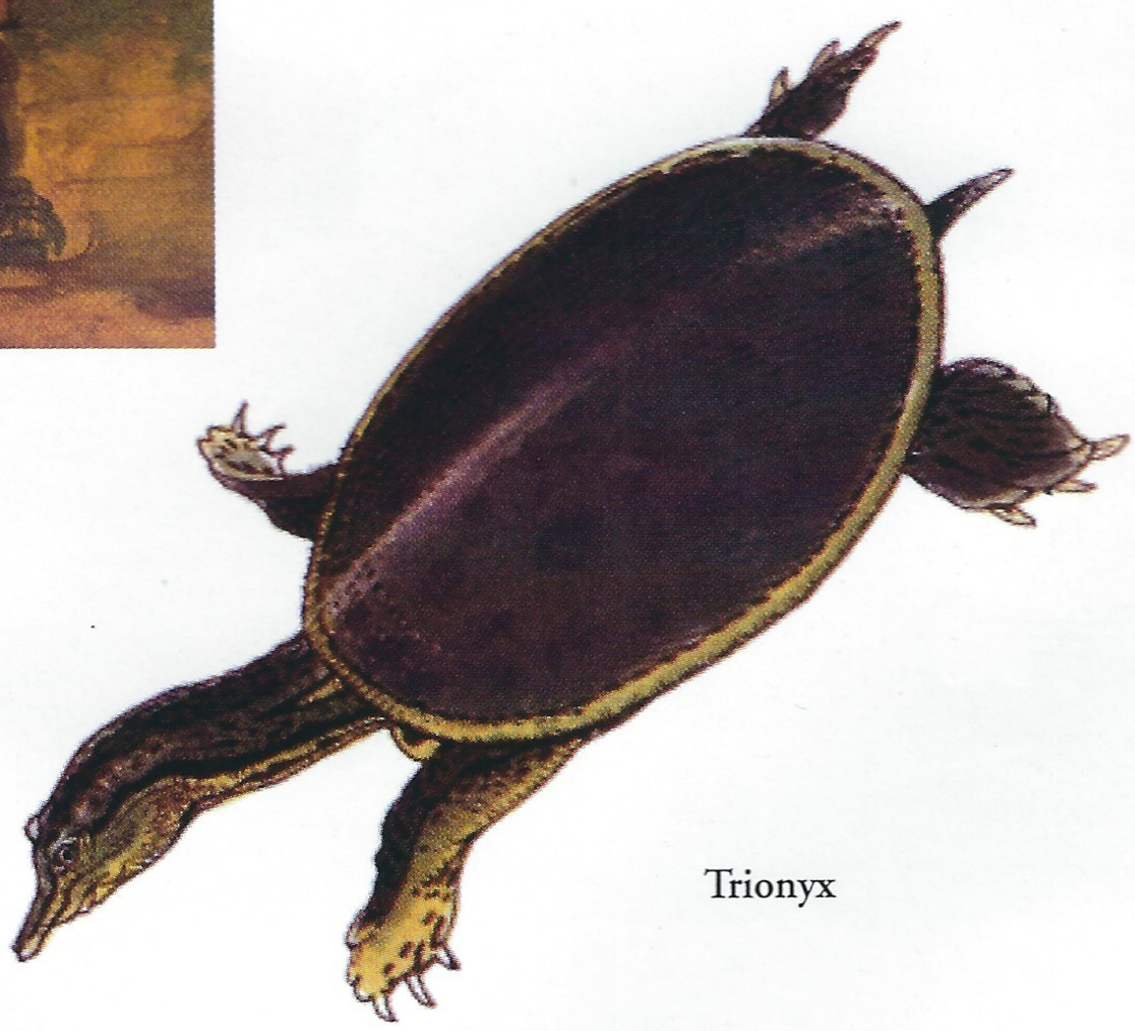
MONGOLEMYS

Turtles lived throughout dinosaur times. Mongolemys was a Mongolian turtle of modest size, at least compared to some of the giant sea turtles of dinosaur time. Archelon, from the American West in Cretaceous times, grew a shell 10 feet wide, larger than any turtle before or since.

SIZE: 2 feet long
TIME: Late Cretaceous, ca. 75 million years ago
FOSSILS FOUND: Western Canada



Proganochelys

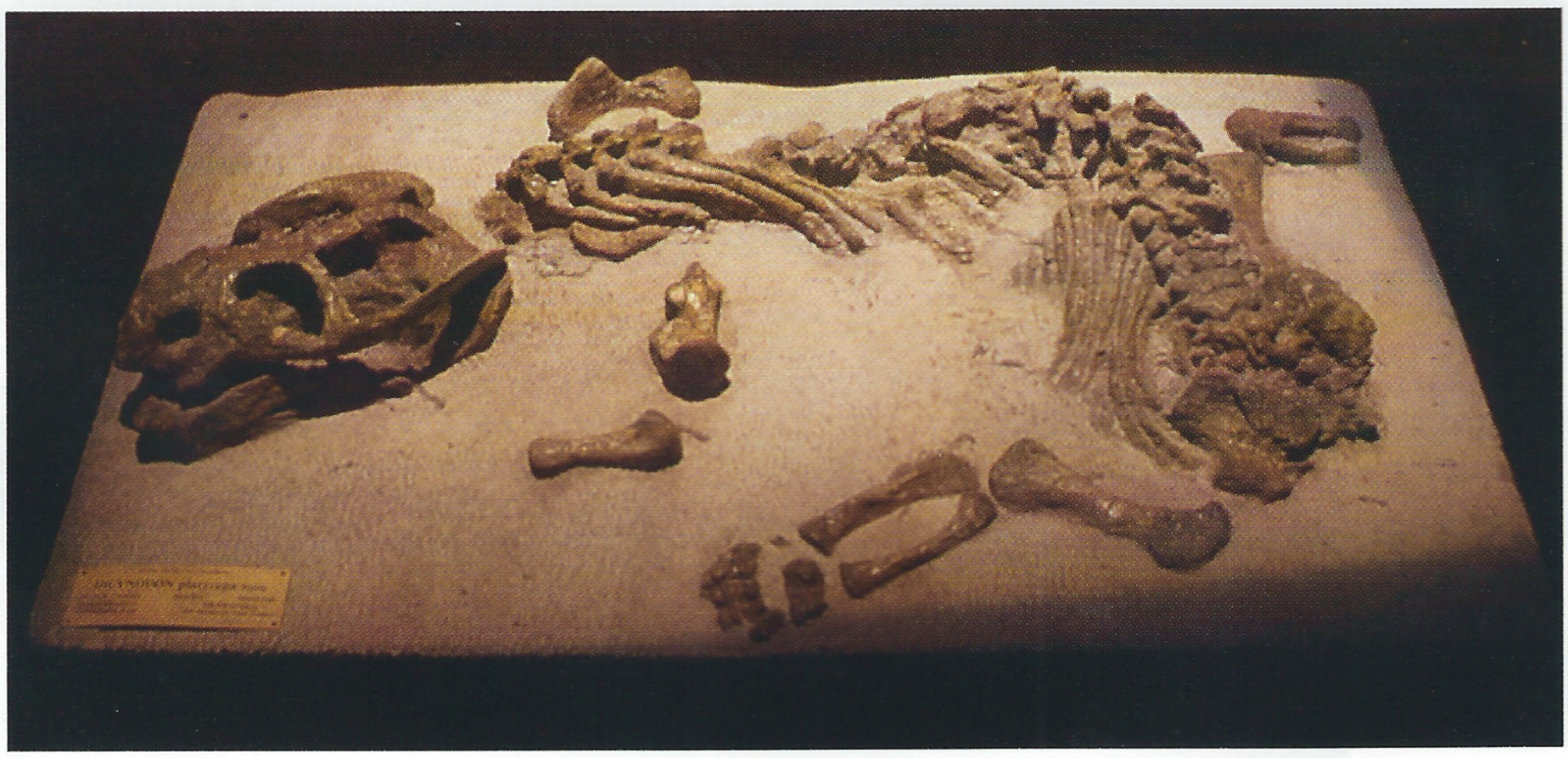


Trionyx

EXTINCTION THEATRE

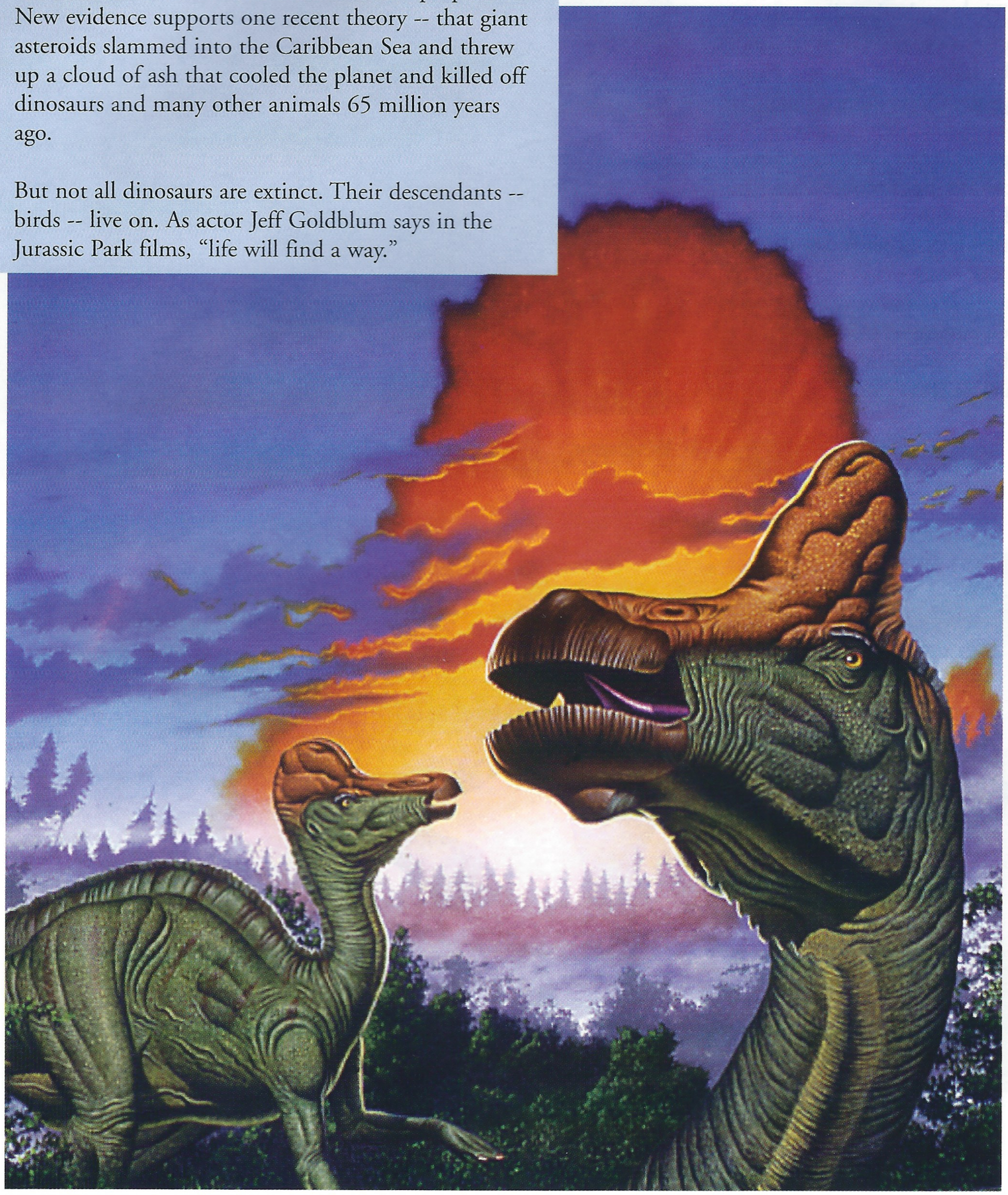
After about 150 million years of dominating the Earth, the dinosaurs died out suddenly—by the standards of Earth's history — within thousands of years. In the Jurassic Park and The Lost World Exhibit's Extinction Theatre, the catastrophe that may have wiped out the dinosaurs is recreated. The effect is replete with smoke, shaking lights and the booming impact of a fireball from space.

EXTINCTION



Why did the dinosaurs die out? Poison plants, gas, freezing weather and volcanic explosions are some of the more than 100 theories scientists have proposed. New evidence supports one recent theory -- that giant asteroids slammed into the Caribbean Sea and threw up a cloud of ash that cooled the planet and killed off dinosaurs and many other animals 65 million years ago.

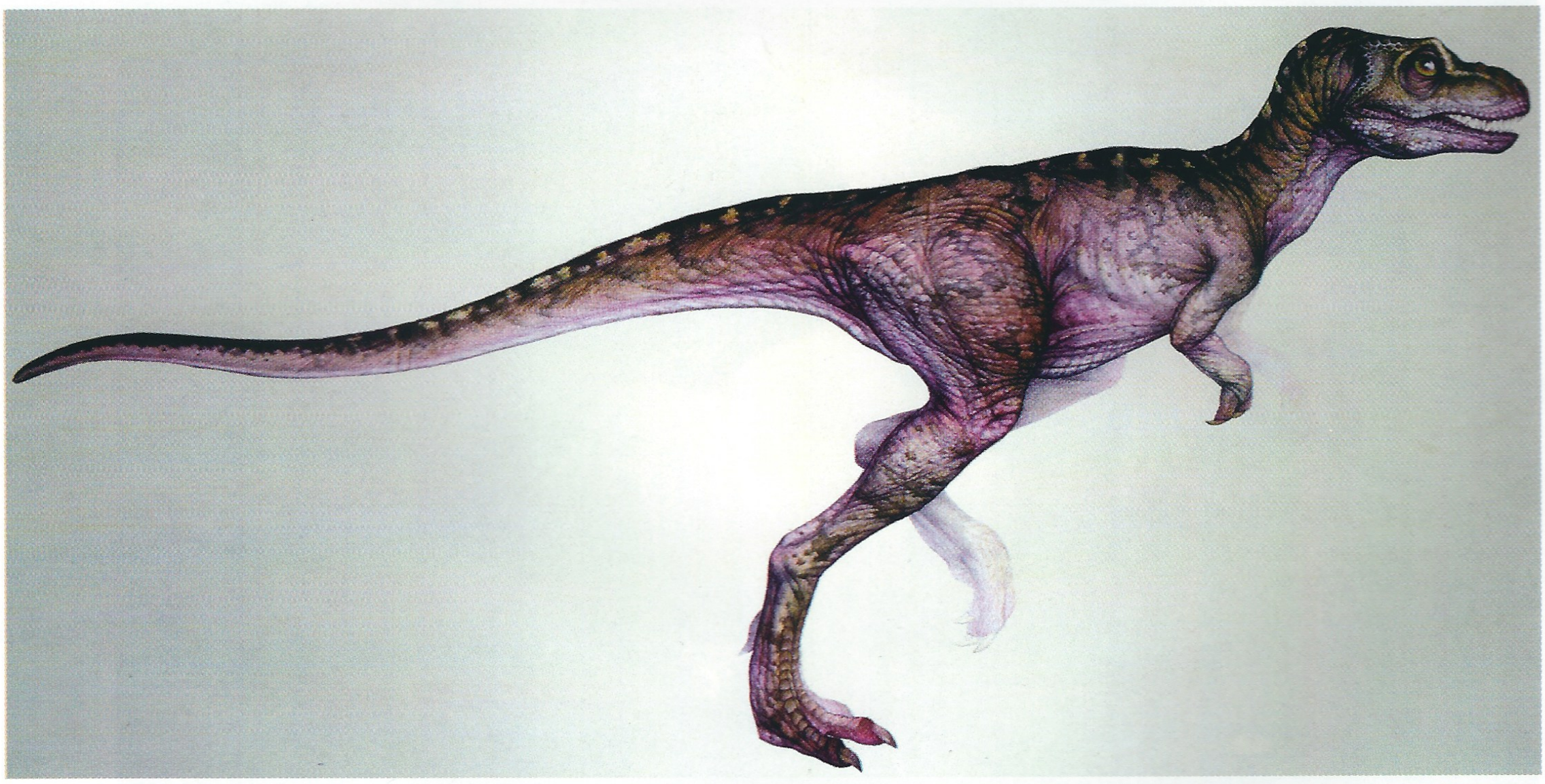
But not all dinosaurs are extinct. Their descendants -- birds -- live on. As actor Jeff Goldblum says in the Jurassic Park films, "life will find a way."



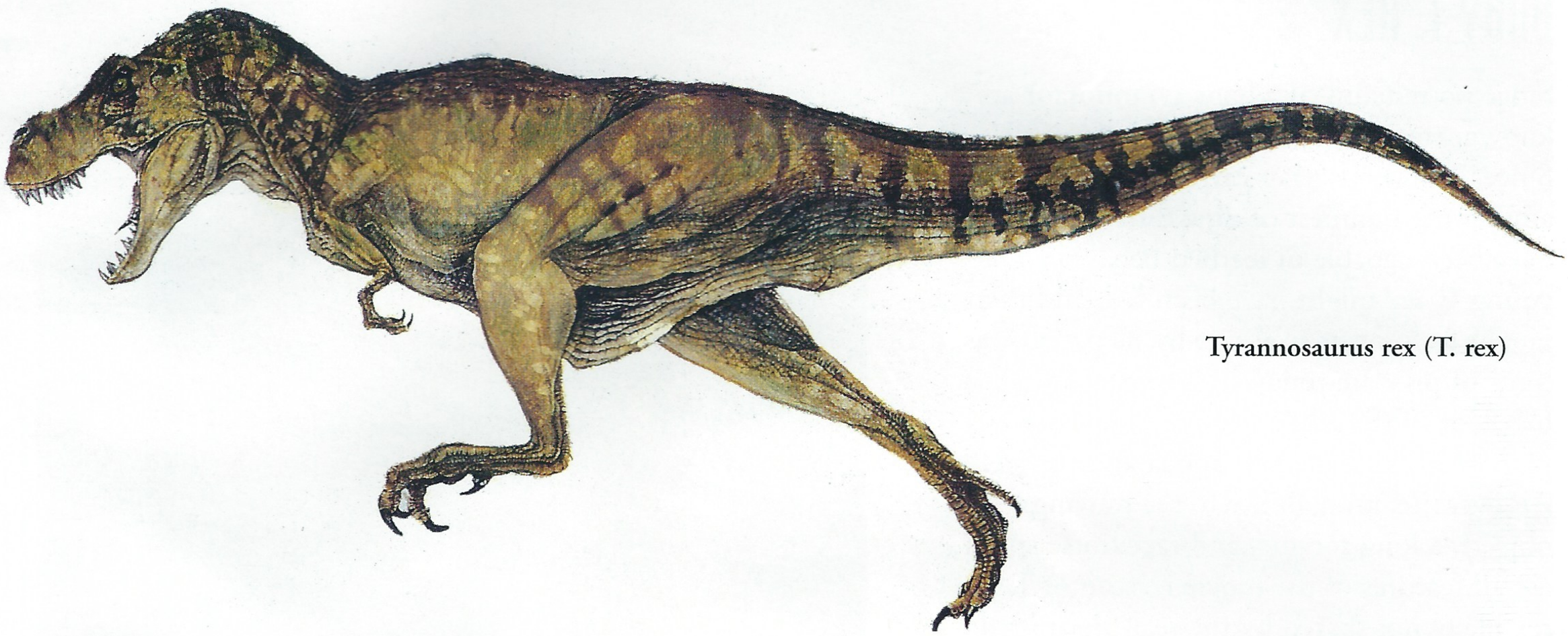
THE MOVIE DINOSAURS

The full-sized dinosaurs of Jurassic Park and The Lost World were fashioned by the artists of Stan Winston Studio. These and other dinosaurs in the film were also created as computer images by Industrial Light and Magic. The Winston dinosaurs were designed as state-of-the-art robotic dinosaurs, programmed for an intricate series of repeatable and fluid movements. The soft and wire-filled versions used in the films, often only in parts, are neither durable nor easily manipulated. But the same molds used to create them have been employed to recast the movie dinosaurs for this exhibit in more durable resin casts.

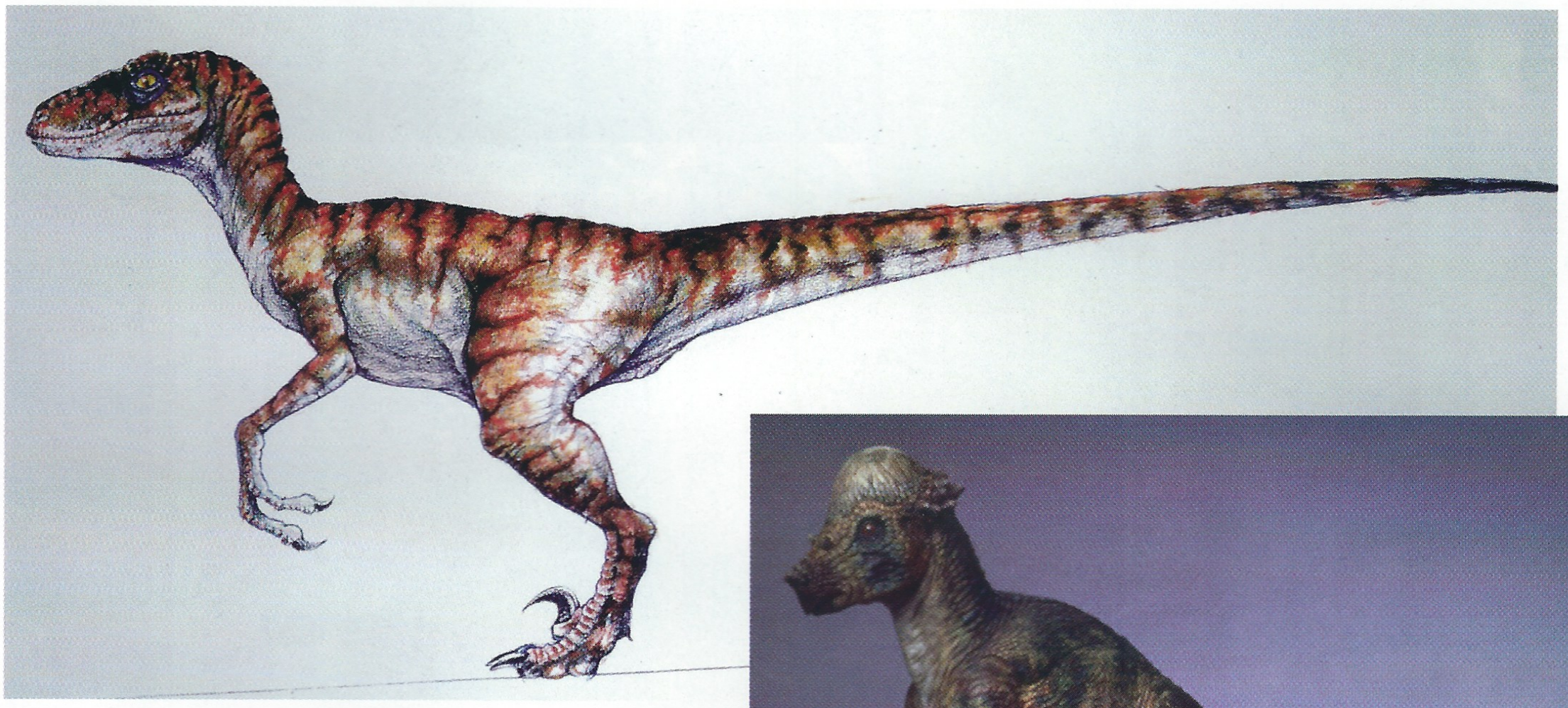
Velociraptor



Baby T. rex



Tyrannosaurus rex (T. rex)



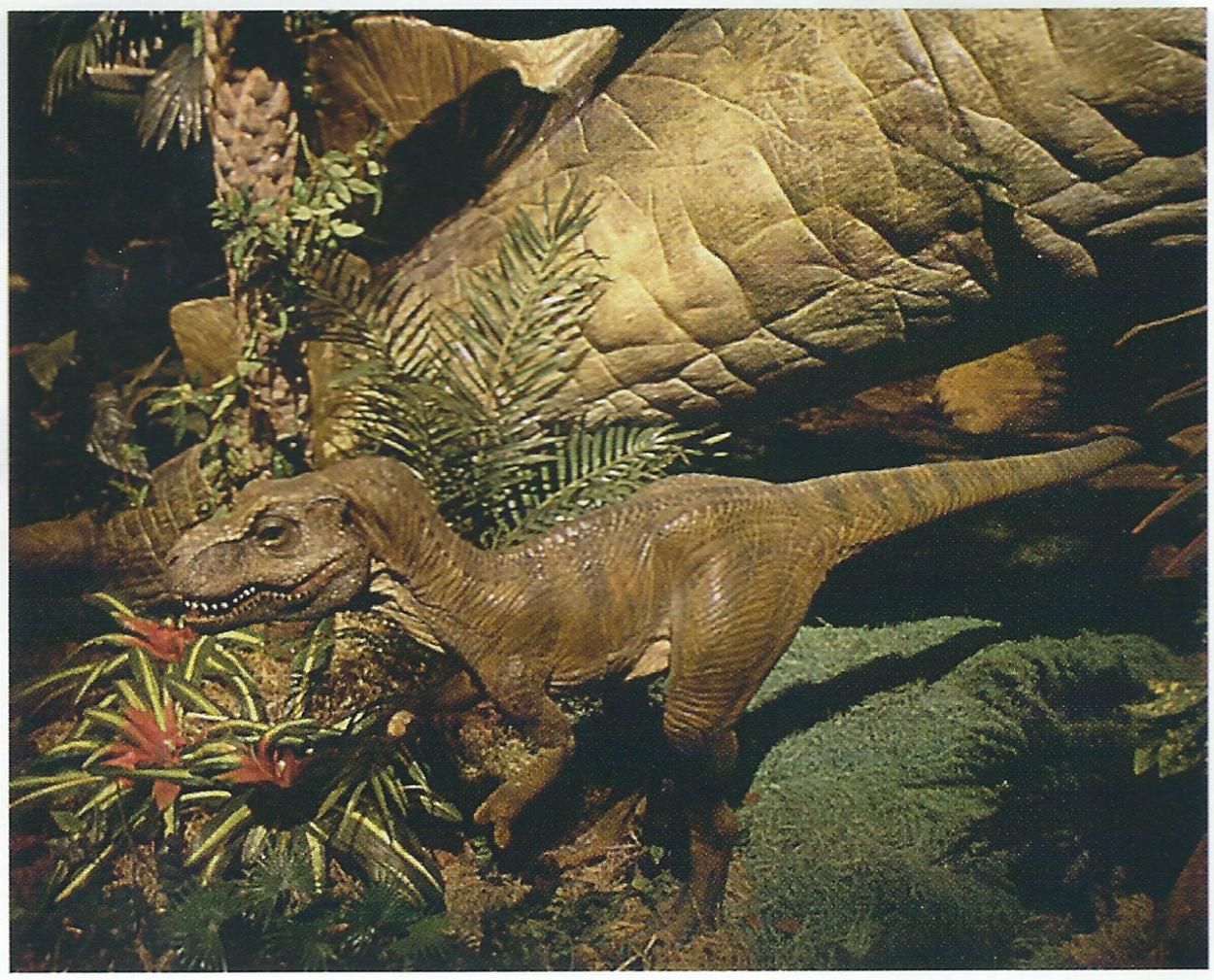
Velociraptor (Raptor)

Pachycephalosaur

THE MOVIE DINOSAURS

BABY T. REX

Since no remains of a baby tyrannosaur are known, this recreation is entirely fanciful. Since T. rex and other carnivores were among the brainiest of dinosaurs, they may have been capable of learned behavior. The young T. rex might have been fed, and then taught to hunt or scavenge by its parents, as birds of prey are today. The nurturing behavior of the adult T. rexes in the movie is speculation. But their appearance is not. An overbite, an inability to see moving objects, a long tongue, and race horse speed are all features of the movie version of T. rex likely not shared by the real-life animal.



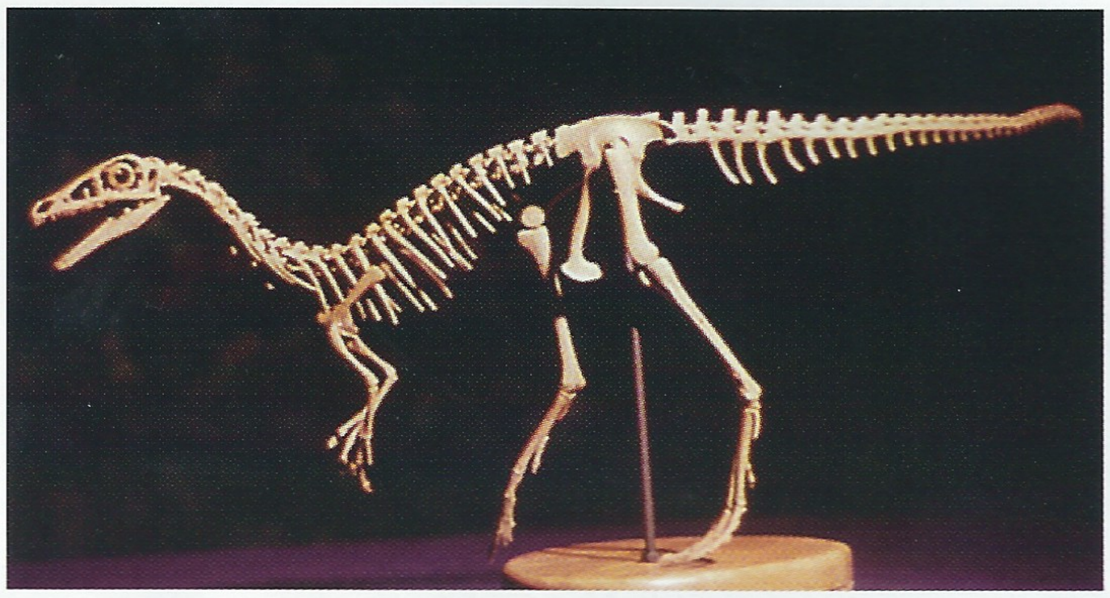
TRICERATOPS

The Triceratops from Jurassic Park is shown here as it appeared in the film, laid low from eating poisonous berries. If it were possible to recreate dinosaurs, they might well be poisoned by the unfamiliar germs and plants in our environment. Even grass would be unfamiliar to dinosaurs.

MOVIE DINOSAURS

COMPSOGNATHUS

The movie dinosaurs vary in size and sometimes in anatomy from the real-life dinosaurs. Compsognathus was among the smallest of dinosaurs, but not as small as in the movie, The Lost World. In the film it travels in packs, while in life it is known from only a few isolated specimens. The first was a juvenile, the size of a chicken, leading researchers to first think this turkey-sized dinosaur was truly tiny.

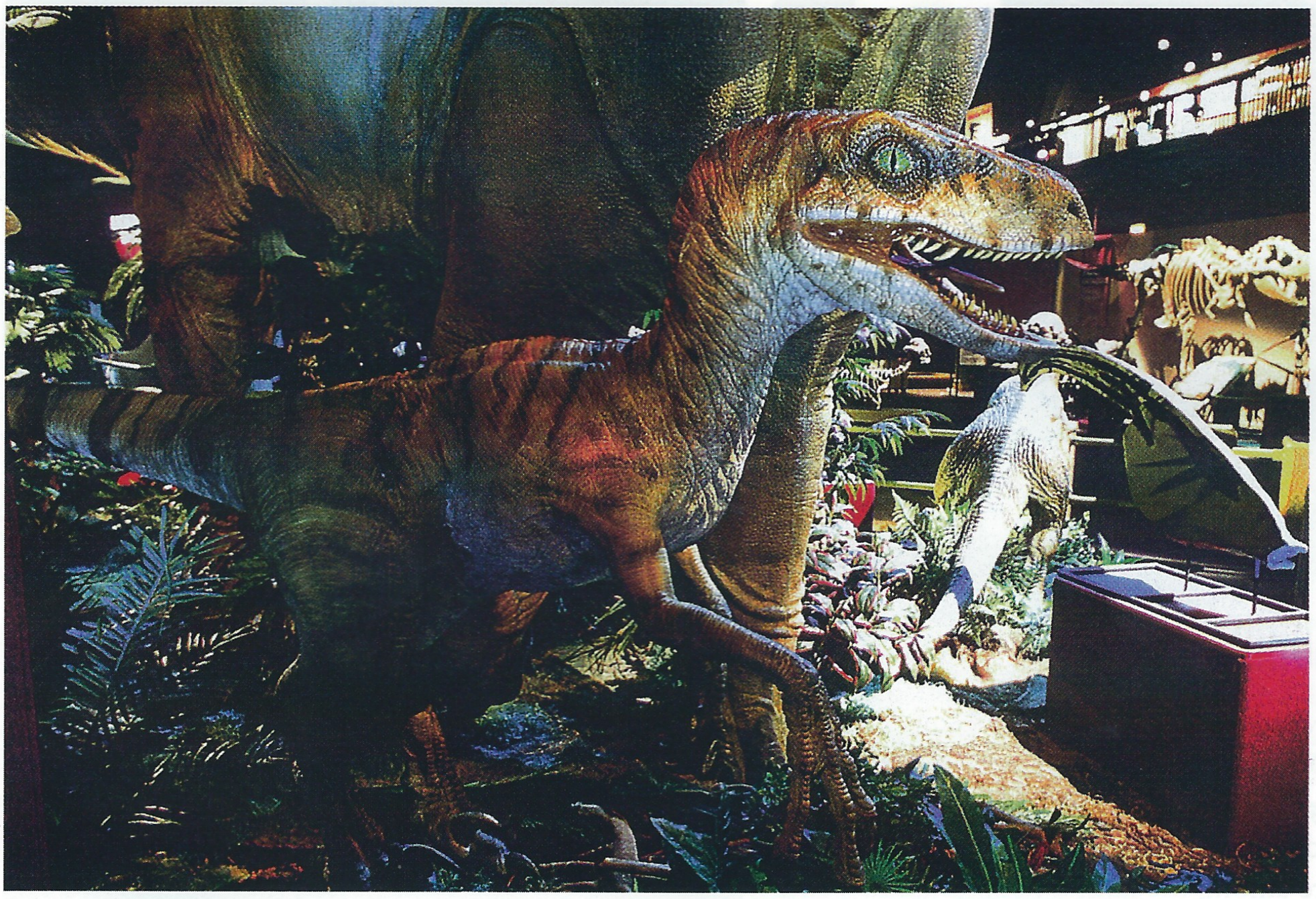


DILOPHOSAURUS

Dilophosaurus, the "spitter" from the film, was far larger in real-life (see page 21) than in Jurassic Park. It likely could not spit poison, since it was not equipped with hollowed teeth to spit poison as snakes are. Nor did it have a frill to shake, like the "spitter," which is patterned upon a small, modern-day frilled lizard from Australia. But the movie dinosaur does feature the peculiar double crest which gave the real-life Dilophosaurus its name.

VELOCIRAPTOR

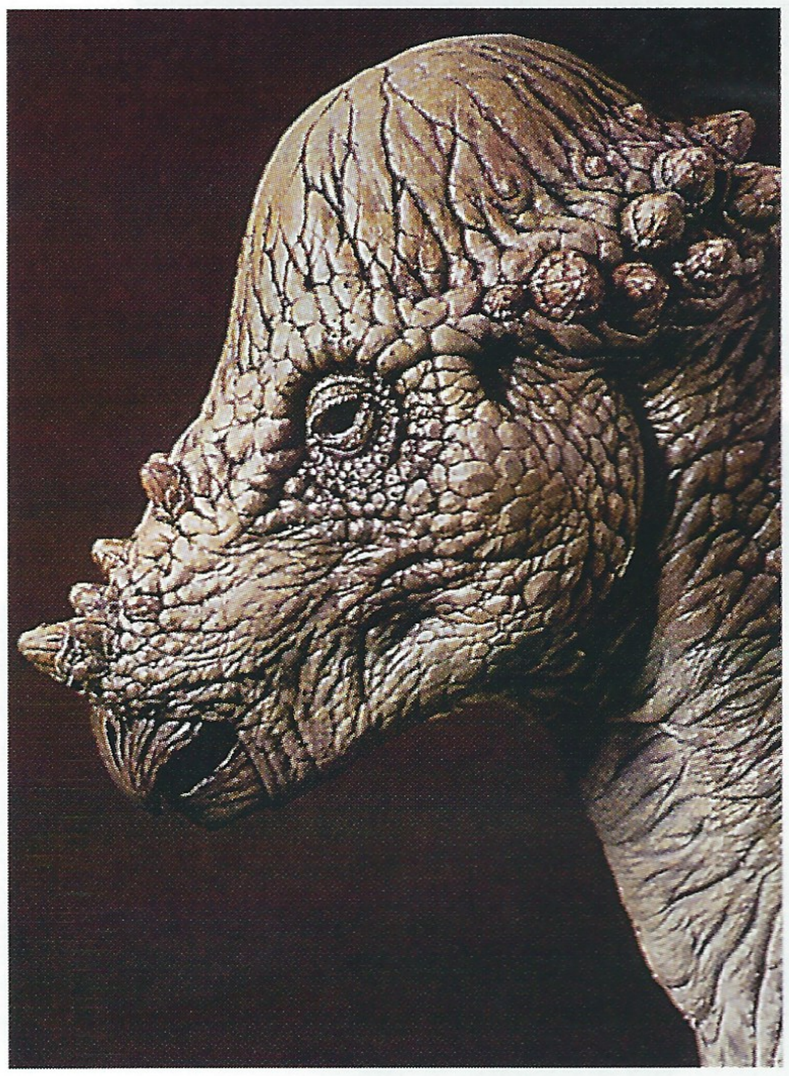
Velociraptors are the villains of both Jurassic Park films. "Fast as a cheetah, smart as a chimpanzee," says a misguided gamekeeper of Velociraptors shortly before he becomes their lunchmeat. "Fast as a poodle, smart as an ostrich" might have been more accurate. Velociraptors were smaller than the Jurassic Park versions which are nearer in size to another "raptor" dinosaur, Deinonychus. Some new-found raptor dinosaurs grew even larger, up to 20 feet long.



MOVIE DINOSAURS

PACHYCEPHALOSAURS

The pachycephalosaurs of The Lost World belong to no particular genus or kind of dome-head dinosaur known to science. They are midway in size between most of the small and relatively slight Pachycephalosaurus and a few very large specimens, including the more than 15 foot long Pachycephalosaurus.

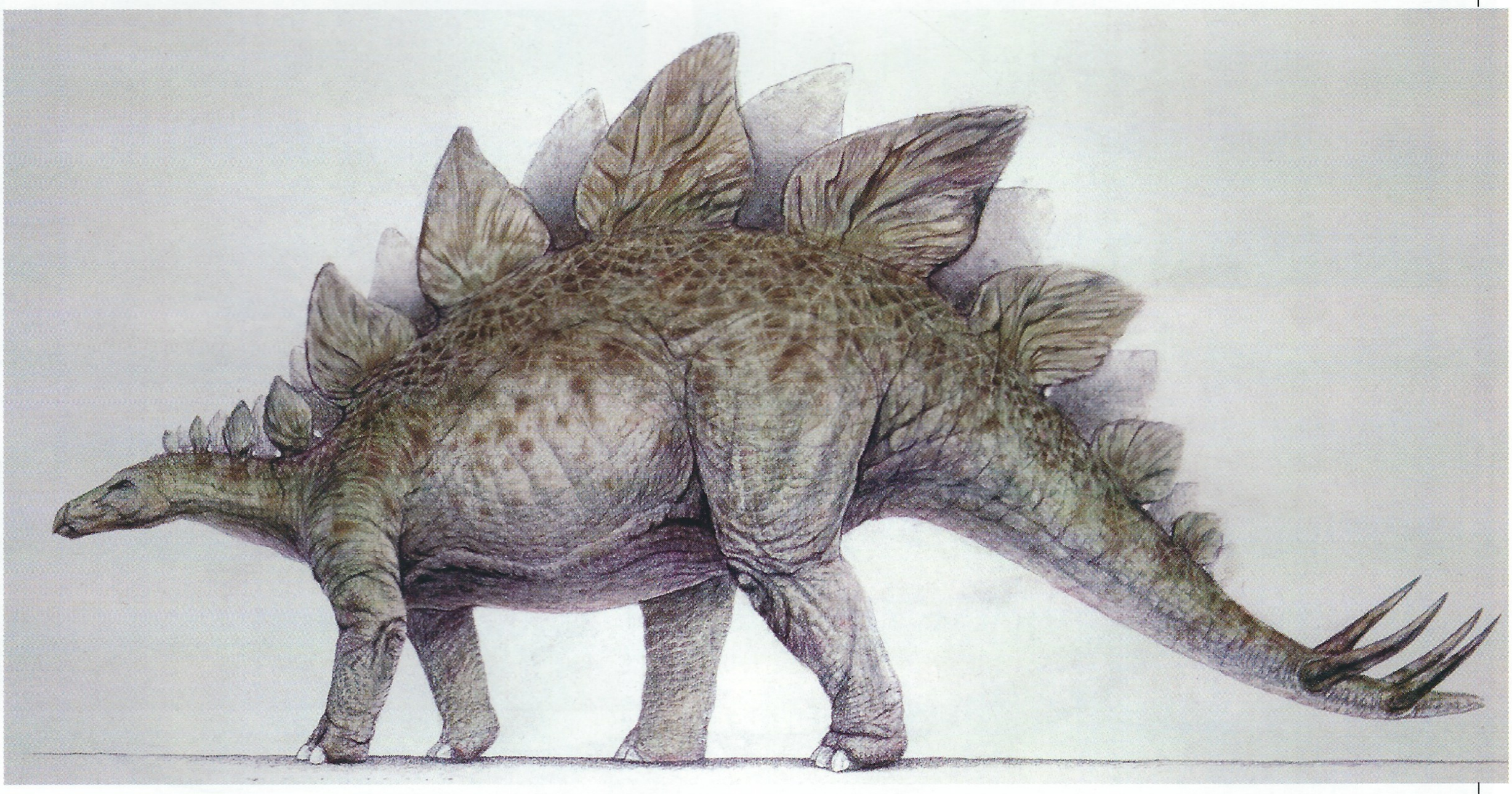


BRACHIOSAURUS

Brachiosaurs are the sneezing, browsing giants of Jurassic Park. We don't know if dinosaurs sneezed, or any were gentle. They probably did, however, spend much of their days browsing on high foliage. Brachiosaurs are among the largest of all dinosaurs and the tallest, at up to 6 stories high.

STEGOSAURUS

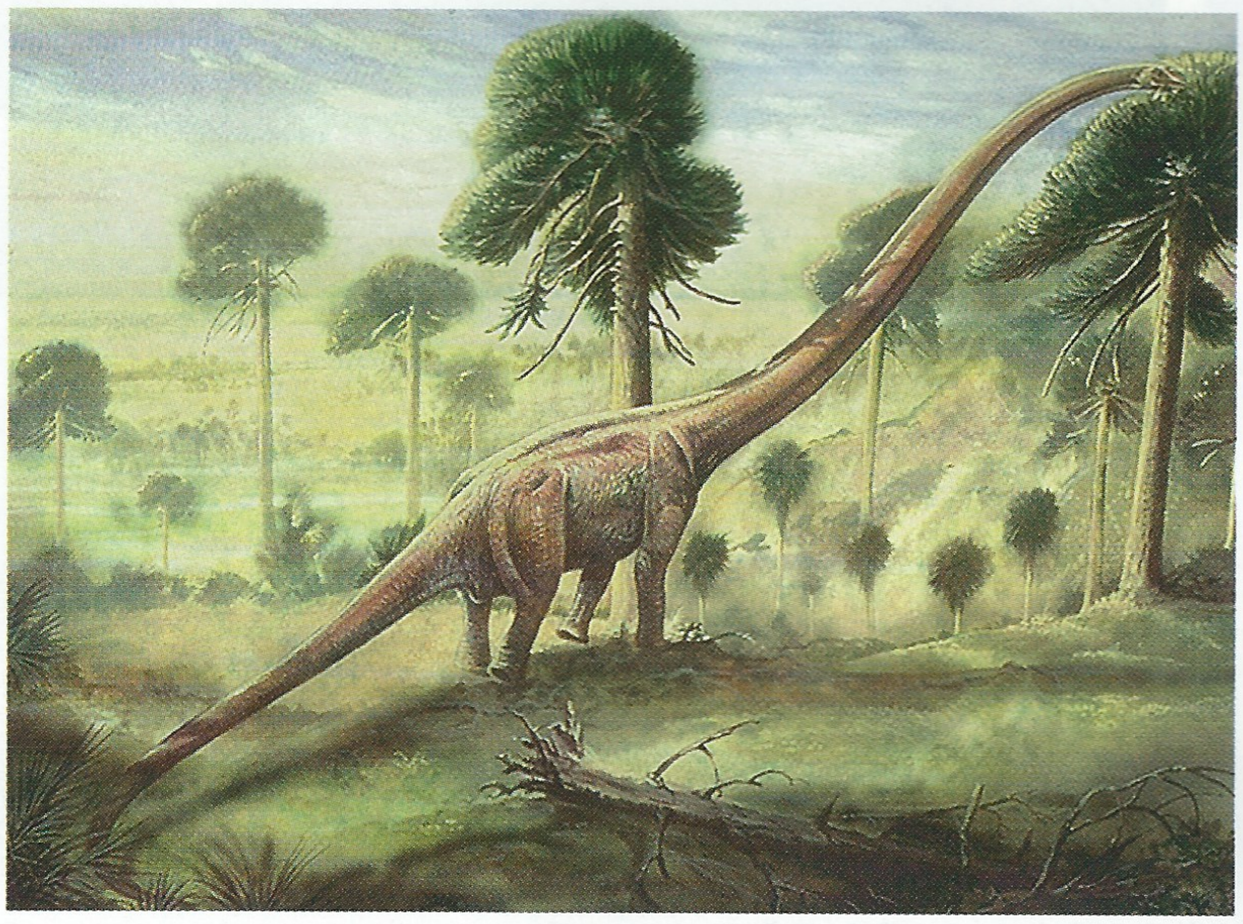
This plate-backed plant-eater is one of the most familiar of all dinosaurs. Plates such as these actual fossils from the American Museum's collection were found a century ago, but until recently no well-preserved complete skeletons had been discovered. Scientists and artists debated whether Stegosaurus had a single row of plates on its back or two rows, as seen in the oversized Stegosaurus in The Lost World. Recent finds show that Stegosaurus had a single row of overlapping plates. Parts of the movie's dinosaur are missing. They were never made, because the robot dinosaur was partly hidden by a tree during filming.

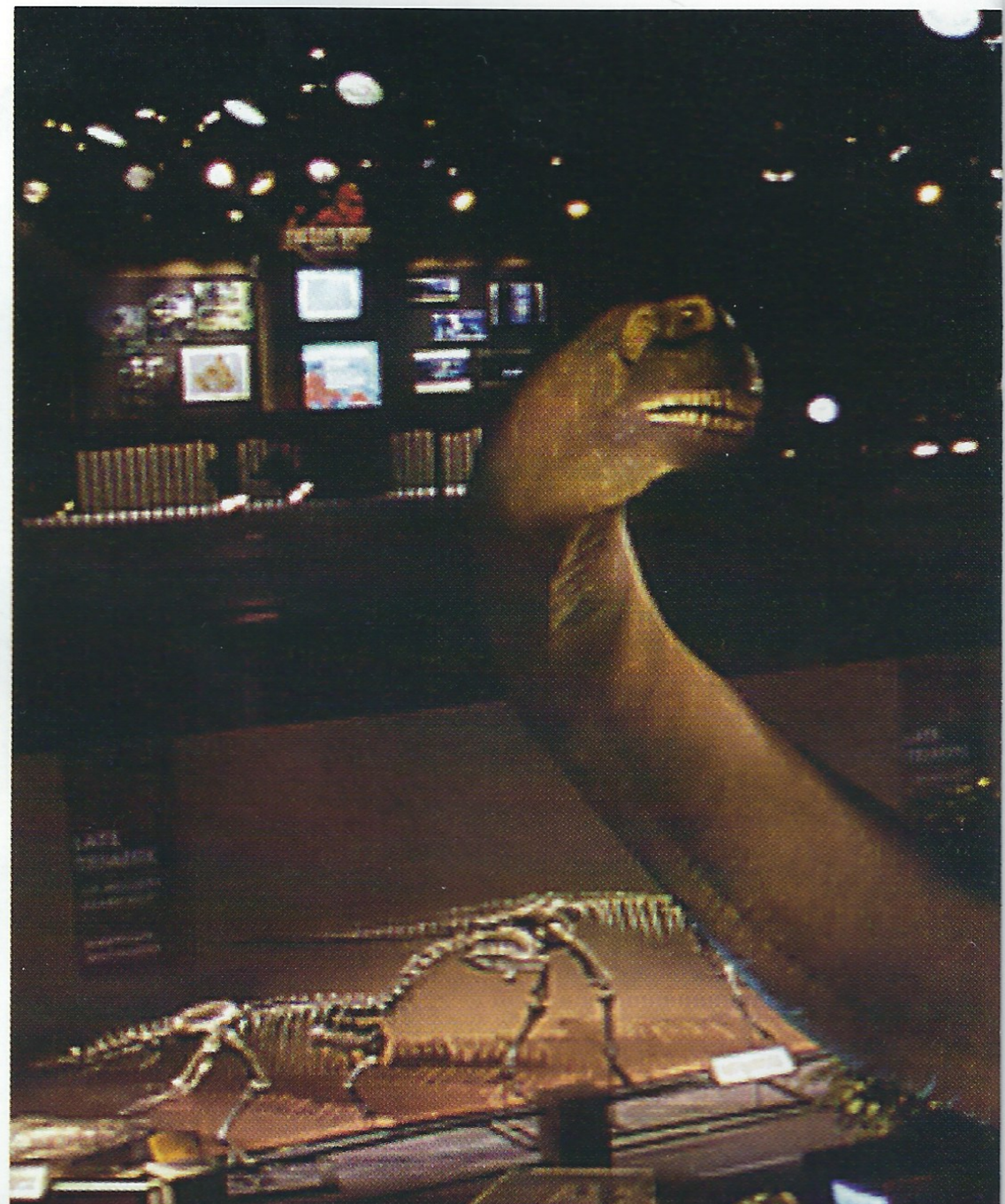


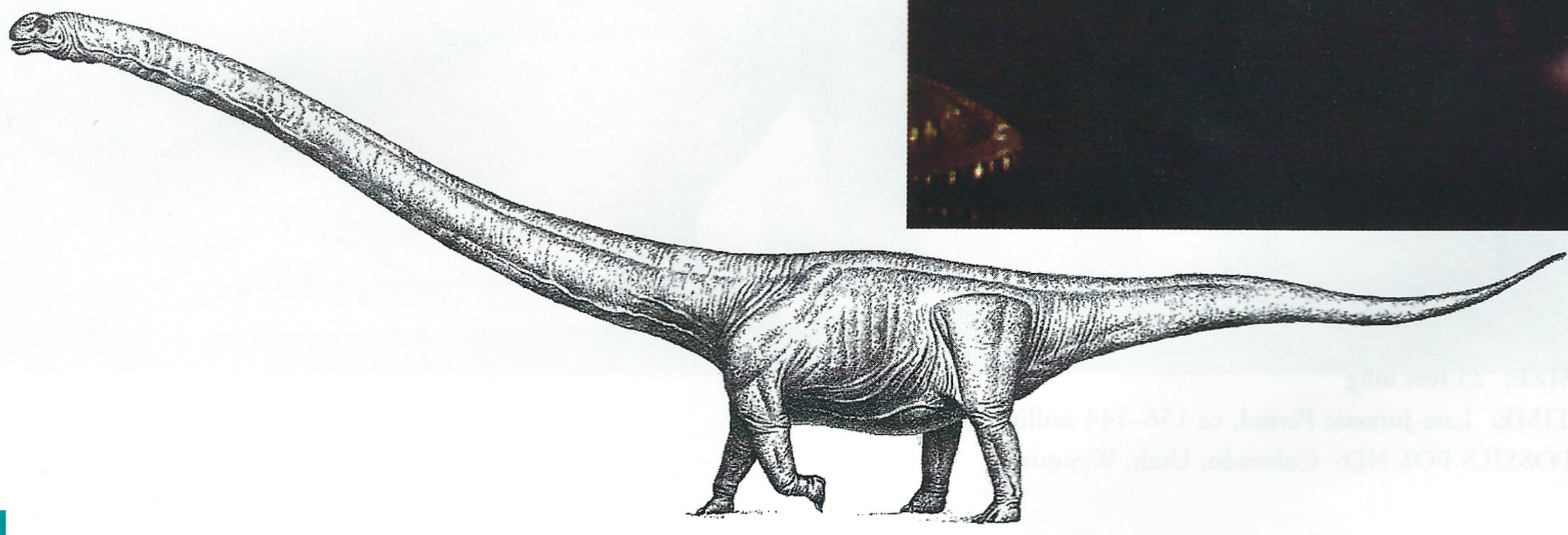
SIZE: 25 feet long
TIME: Late Jurassic Period, ca 156–144 million years ago
FOSSILS FOUND: Colorado, Utah, Wyoming

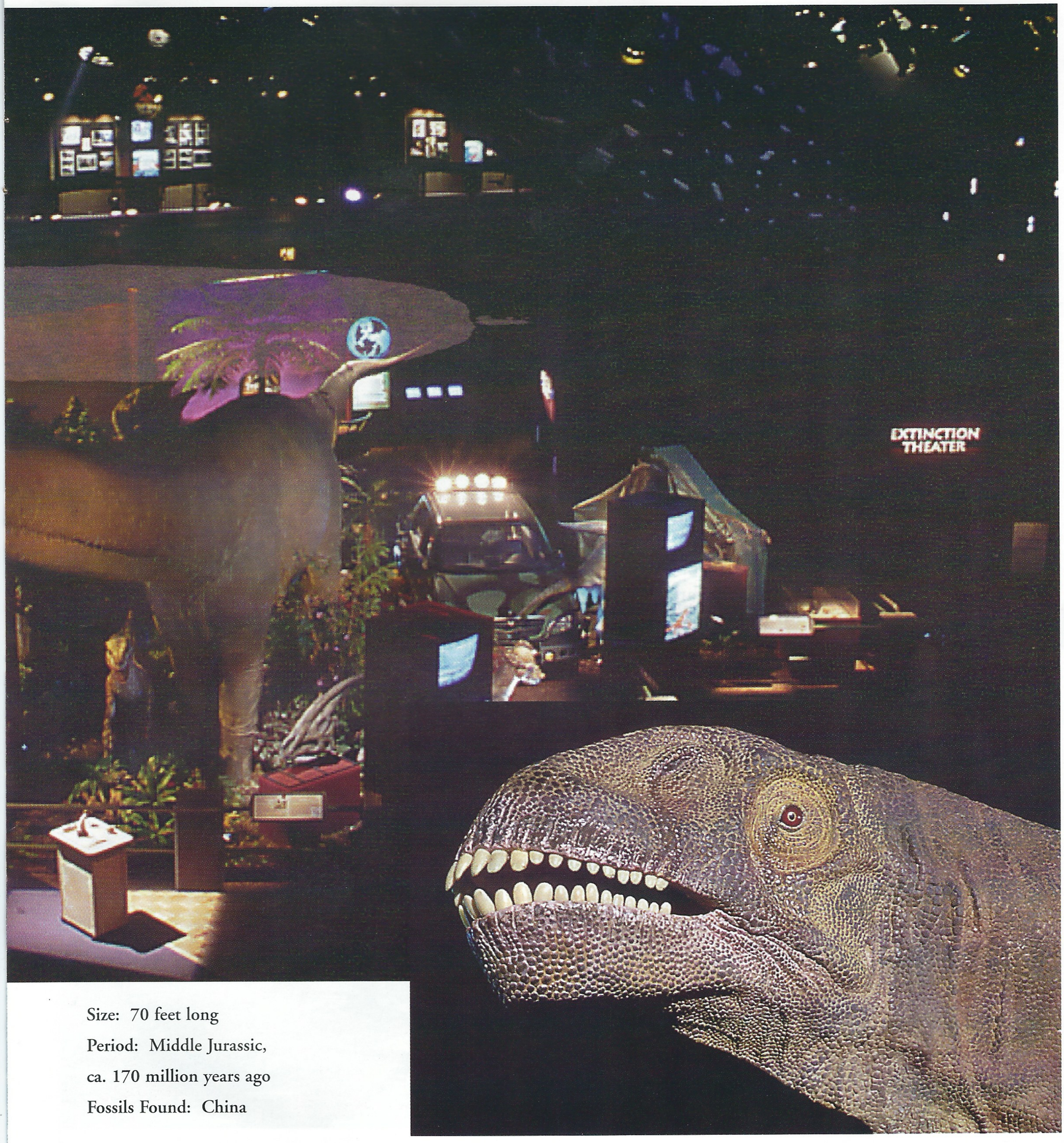
MAMENCHISAURUS: A GIANT AMONG GIANTS

The world's largest scientifically recreated dinosaur stands within the Jurassic Park and Lost World exhibit. Though it appeared only fleetingly in The Lost World, Mamenchisaurus dominates the exhibit with its 30 foot neck. The largest plant-eating dinosaur from China, it had the longest neck of any animal ever, and the smallest head compared to body size.









Size: 70 feet long

Period: Middle Jurassic,
ca. 170 million years ago

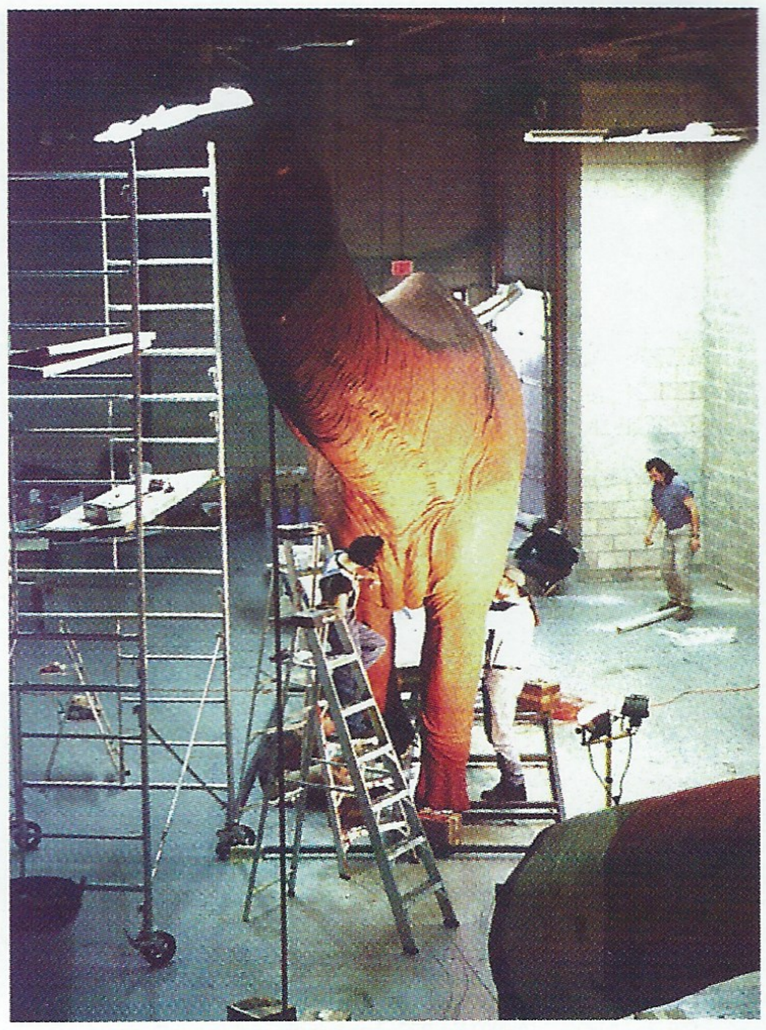
Fossils Found: China

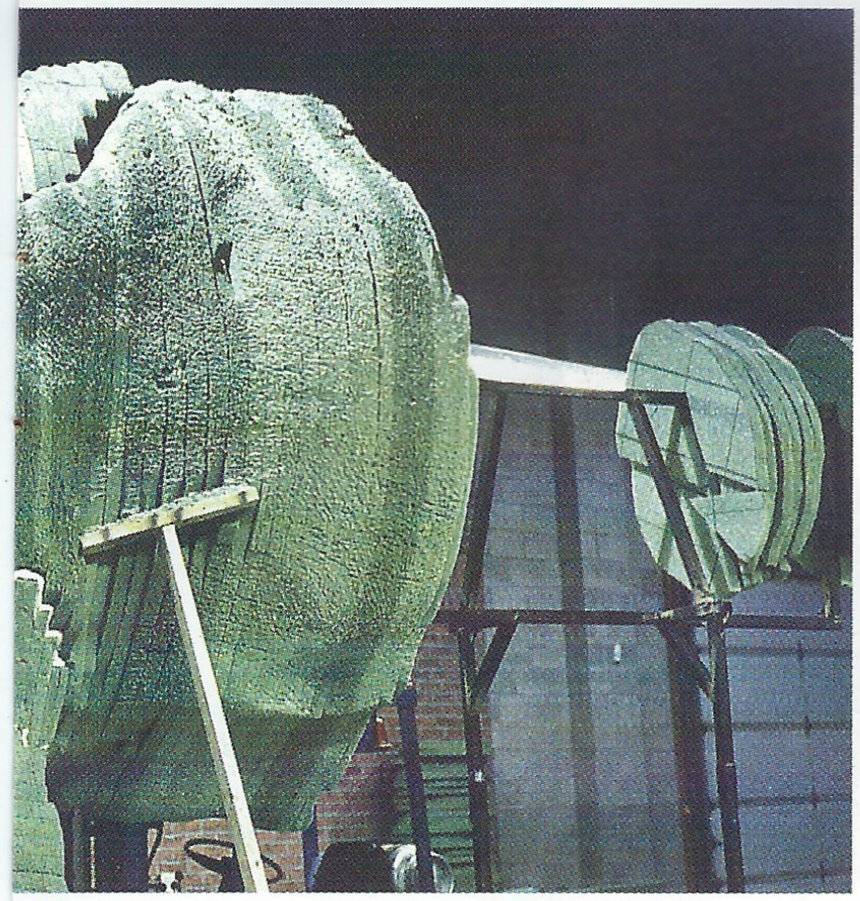
BUILDING MAMENCHISAURUS

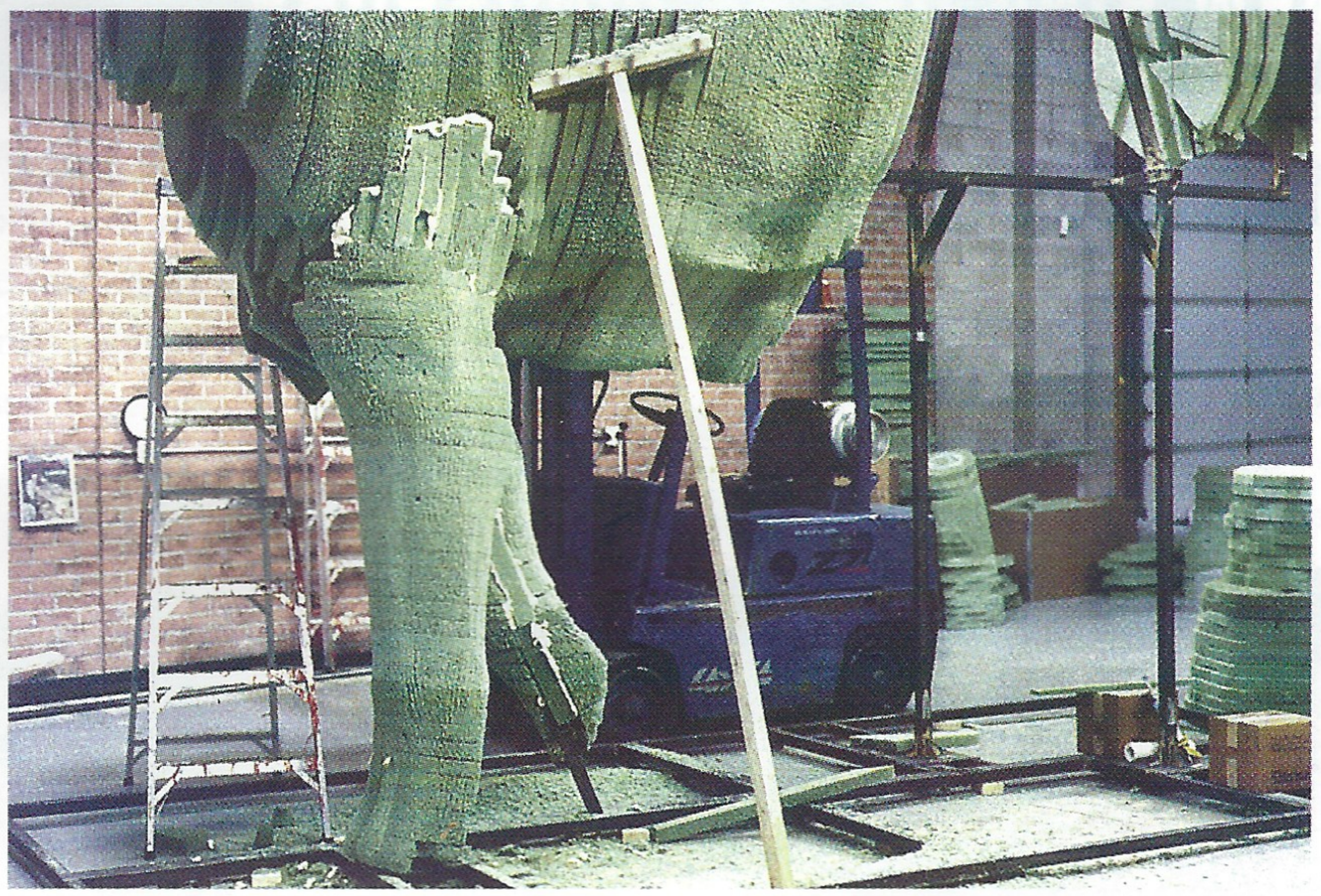
This giant Chinese plant-eater is seen briefly via computer animation in The Lost World. In the Jurassic Park and Lost World exhibit, Mamenchisaurus is recreated whole, according to the latest scientific information by Canadian artist and animator Hall Train.

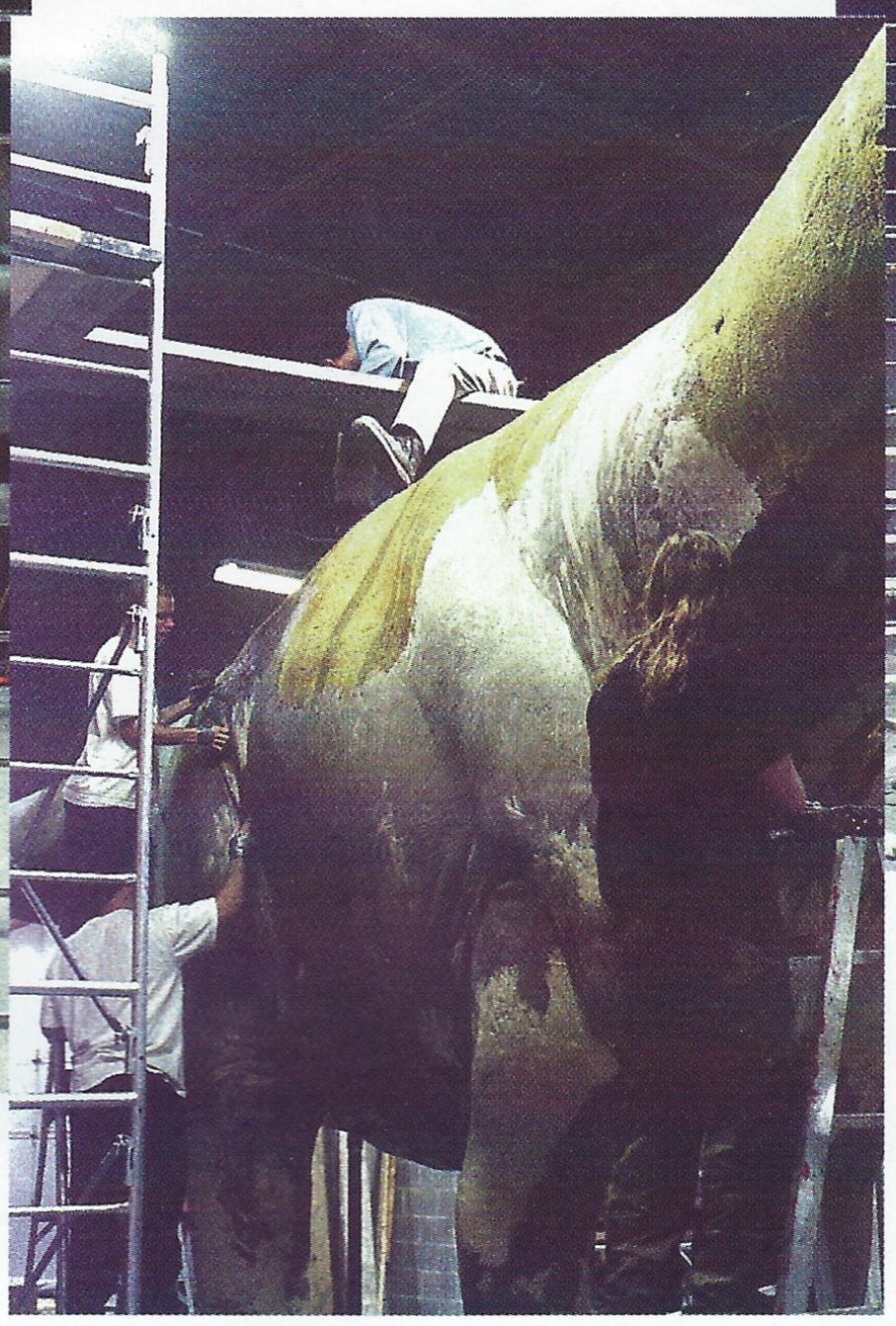
Train used his own pioneering casting methods to create the entire dinosaur from drawings to finished sculpture in less than three months. He began with a four-foot long and highly accurate model. Via computer imagery this image was projected onto a full-sized styrofoam form in sections. These sections were linked and sculpted over with clay using specially designed skin patterning devices. Molds in sections less than 10 feet wide and six feet long -- to fit through museum doorways -- were made from the full-sized sculpture. Resin casts made from the molds were bolted together with the help of cranes and scaffolding, AND one small technician climbing all the way up the neck to fasten the head in place.

The result is a meticulously rendered dinosaur nearly 70 feet long. The neck is fashioned with variable positions, to allow the animal to rear its head over 25 feet high in tall exhibit halls, and tilt to under 14 feet in smaller hallways.



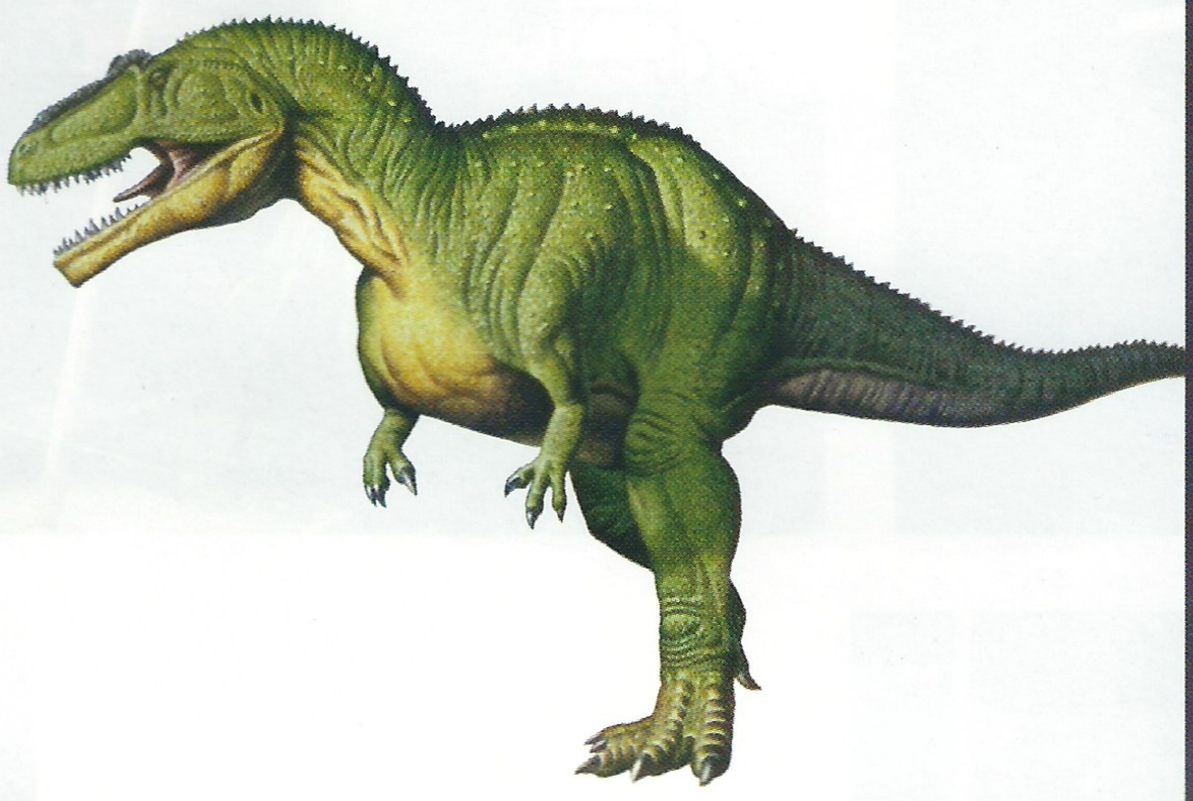






INTRODUCING GIGANOTOSAURUS — THE NEW KING OF THE DINOSAURS

Scientists have recently unearthed a meat-eating dinosaur even larger than Tyrannosaurus rex. Excavated in Patagonia, Argentina, its name is Giganotosaurus, Giant of the South. For the first time in any exhibit, Giganotosaurus's 6-foot long skull, and in some venues its entire 42 foot-long skeleton, joins the DINOSAURS OF JURASSIC PARK AND THE LOST WORLD exhibit.



MEMBER HIP

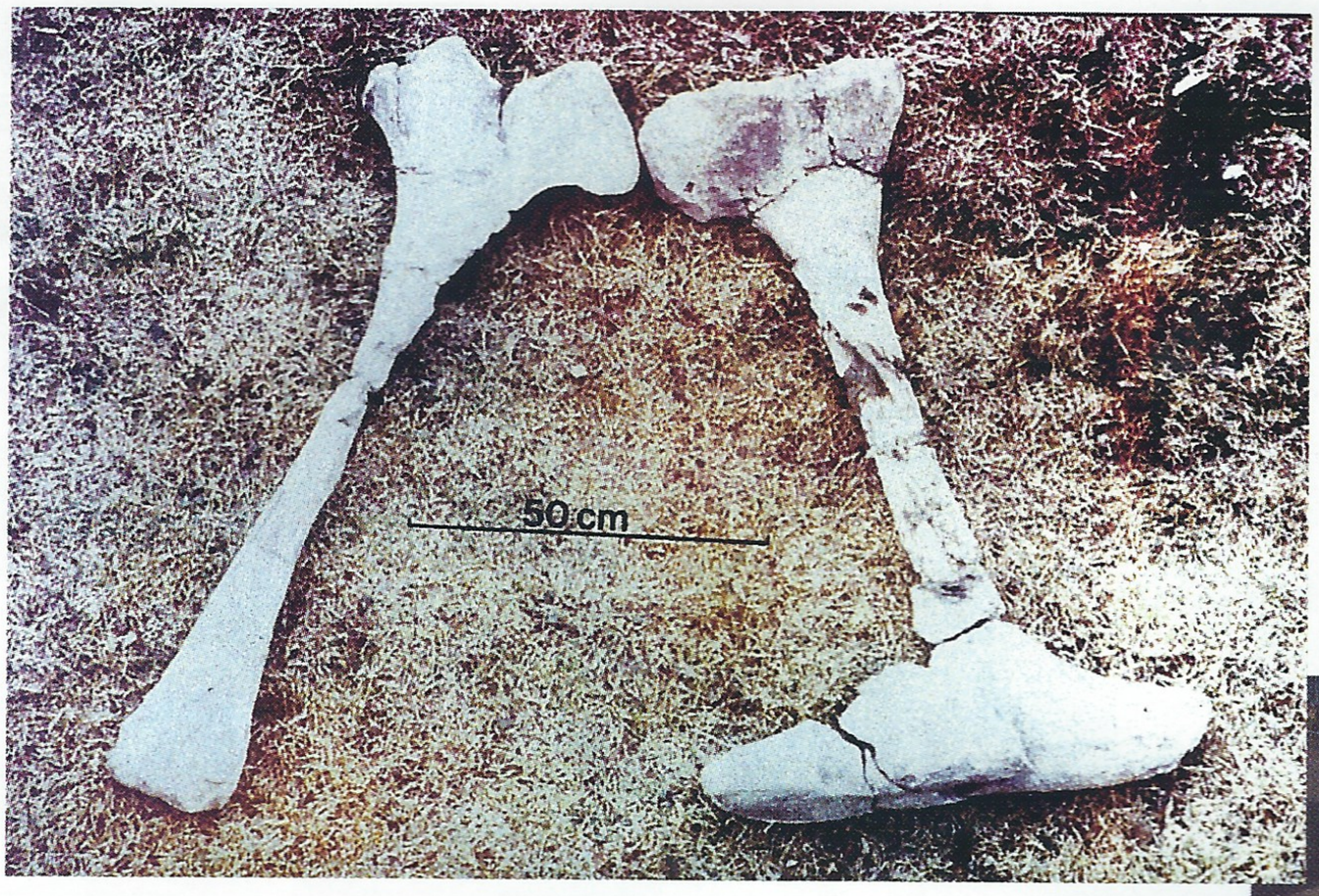
GIGANOTOSAURUS RECONSTRUCTION

More than 70% of the skeleton of Giganotosaurus was excavated over more than a month of digging. The bones were cleaned in Argentina and molded under the supervision of paleontologist Rodolfo Coria and artisan Mary Odano of California. Missing elements were sculpted by Argentine artist Maria del Carmen Gravino.

Barry and April James of Prehistoric Journeys created the armature to erect the first Giganotosaurus skeletons in their rural Pennsylvania barn.

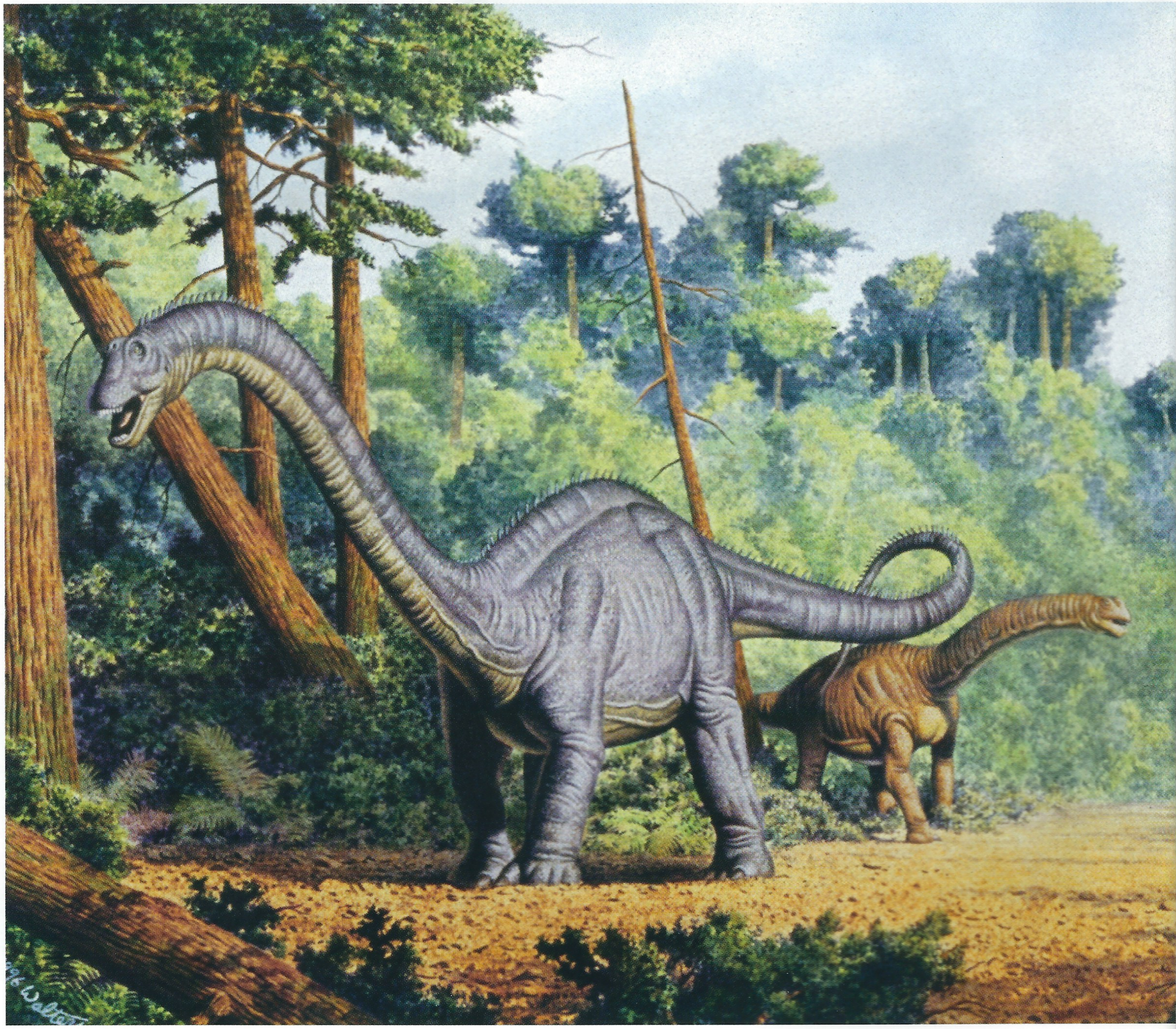
Reconstructed, Giganotosaurus stands nearly 13 feet tall and measures 42 feet long, a foot longer than the largest Tyrannosaurus rex.

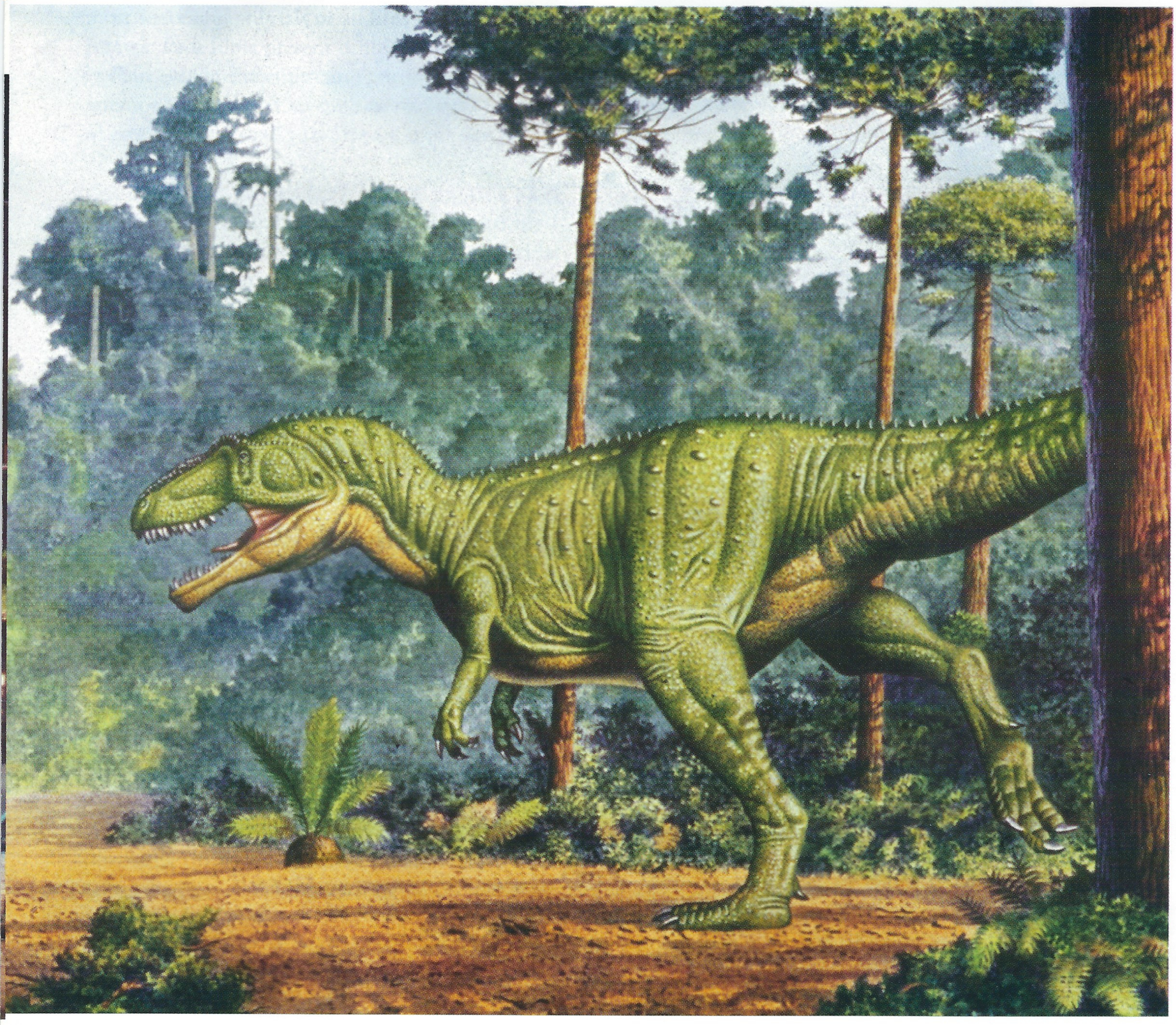
T. rex lived only in western North America 65 million years ago. Giganotosaurus lived in South America 100 million years ago. Its jaws and teeth are more narrow than those of T. rex. A close relative of Giganotosaurus, nearly as large, named Carcharodontosaurus (shark-toothed reptile) lived in its time, in Africa.


50 cm

GIGANOTOSAURUS THE HUNTER

So what was life like for Giganotosaurus? Giganotosaurus lived among conifer trees and savannah-like open lands 100 million years ago. Its prey included giant planteaters like Rebbachisaurus, which measured more than 70 feet long and 30 tons in weight. Whereas T. rex was the largest dinosaur in its world, Giganotosaurus lived among dinosaur prey more than five times its weight and nearly twice its length. Using its sharp and narrow teeth, Giganotosaurus may have slashed at the flanks of these giant dinosaurs, carving their sides as you would cut up a Thanksgiving turkey.





RESOURCES

BOOKS

Diagram Group, ***The Dinosaur Data Book***, Avon.
A good paperback reference with brief descriptions of many dinosaurs.

Dixon, Dougal et al, ***Illlustrated Encyclopedia of Dinosaurs and Prehistoric Mammals***
A good overview, well-illustrated, with brief entries.

Dixon, Dougal, ***Dinosaurs***, Boyd's Mills Press
A child-friendly, well-illustrated overview of dinosaurs.

Gaffney, Eugene. ***The Golden Guide to Dinosaurs***, Golden Books.
A small, brief and useful reference.

David Lambert and The Diagram Group. ***The Field Guide to Prehistoric Life***, Avon.
A useful paperback summary of life's history.

Lessem, Don, ***Dinosaur Worlds***. Boyd's Mills Press
A sampling of 16 major environments throughout dinosaur time, featuring other animals as well as dinosaurs that lived in those habitats. Well-illustrated. *

Lessem, Don. ***Jack Horner: Living With Dinosaurs***. An NSTA award winning children's biography of a great and unusual dinosaur researcher who found the first dinosaur nests in North America.*

Lessem, Don and Donald Glut. ***The Complete Dinosaur Society Encyclopedia by Random House***. The most complete A to Z illustrated inventory of dinosaurs.*

Norman, David. ***Prehistoric Life, The Rise of the Vertebrates***, MacMillan.
A beautifully illustrated large-size overview by a distinguished scientist.

Norman, David. ***The Illustrated Encyclopedia of Dinosaurs***. Crescent/Crown.
The most comprehensive look at dinosaurs by group, well illustrated.

Walker, Cyril and David Ward. ***Fossils. Eyewitness Handbooks***, Dorling/Kindersley.
A beautifully illustrated paperback sampling of life through time.

CD-ROMS

Microsoft Dinosaurs. Selected dinosaurs, videos, and guided tours by Don Lessem.*

Dinosaur Adventure. Knowledge Adventure. A dinosaur game with some information for young children.

Grolier Prehistoria. An encyclopedia of extinct life.

VIDEOS

Life In The Rocks. Turner Publishing. A four-hour David Attenborough presentation on prehistoric life.

Dinosaurs. WHYY-PHILADELPHIA. A PBS 4 hour series now available on video.

***T. rex* Exposed**. NOVA - WGBH-TV-BOSTON. An hour on the excavation and popularization of T. rex.

**Available at a teacher's 20% discount from Dinosaur Productions, 84 Moffat Road, Waban, MA 02168.*

WEB SITES

www.giganotosaurus. com
Join the chase to find the hidden skull (you can win it) of *Giganotosaurus*, the largest meat-eating dinosaur and learn more about its discovery.

www. lostworld.ex.tour.com
A new site providing an on line tour of THE DINOSAURS OF THE LOST WORLD JURASSIC PARK exhibit.

http://www. dinopro.com
For more information about Dinosaur Productions and its books and casts of dinosaur parts, contact this website.

CASTS

A variety of low-cost and durable cast items, including raptor claws, *T. rex* and *Giganotosaurus* teeth and many others are available from Dinosaur Productions at a 20% teacher's discount — contact Dinosaur Productions at 84 Moffat Road, Waban, MA 02168 or http://www.giganotosaurus.com on the web.

CREDITS

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Dinosaur art and sculpture was provided by Robert F. Walters, Jan Sovak, Steve Kirk, Boyds Mills Press, Brian Cooley, Jim Robins, "Crash" McCreery, Bruce J. Mohn, Marshall Editions, and The Great Russian Dinosaurs Exhibit.

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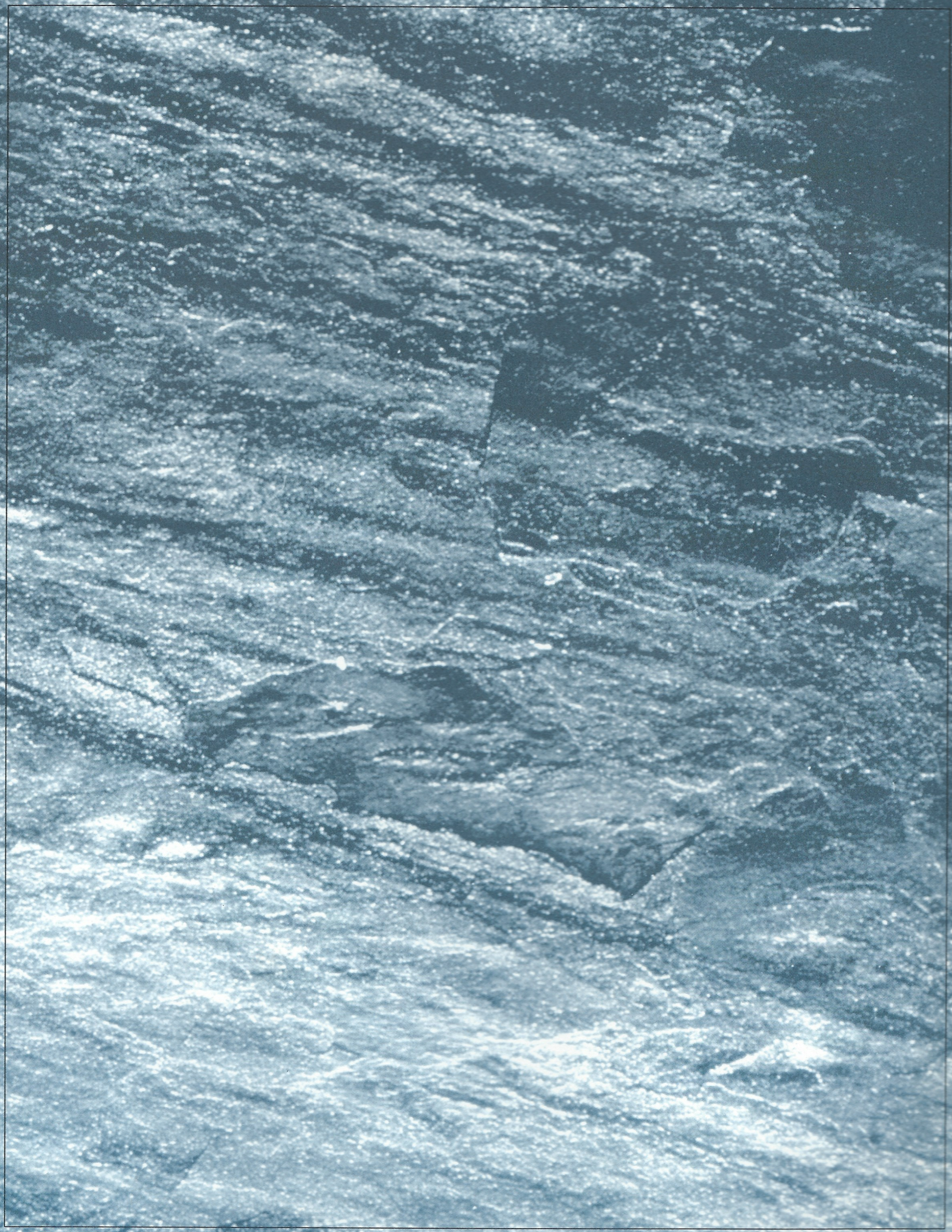

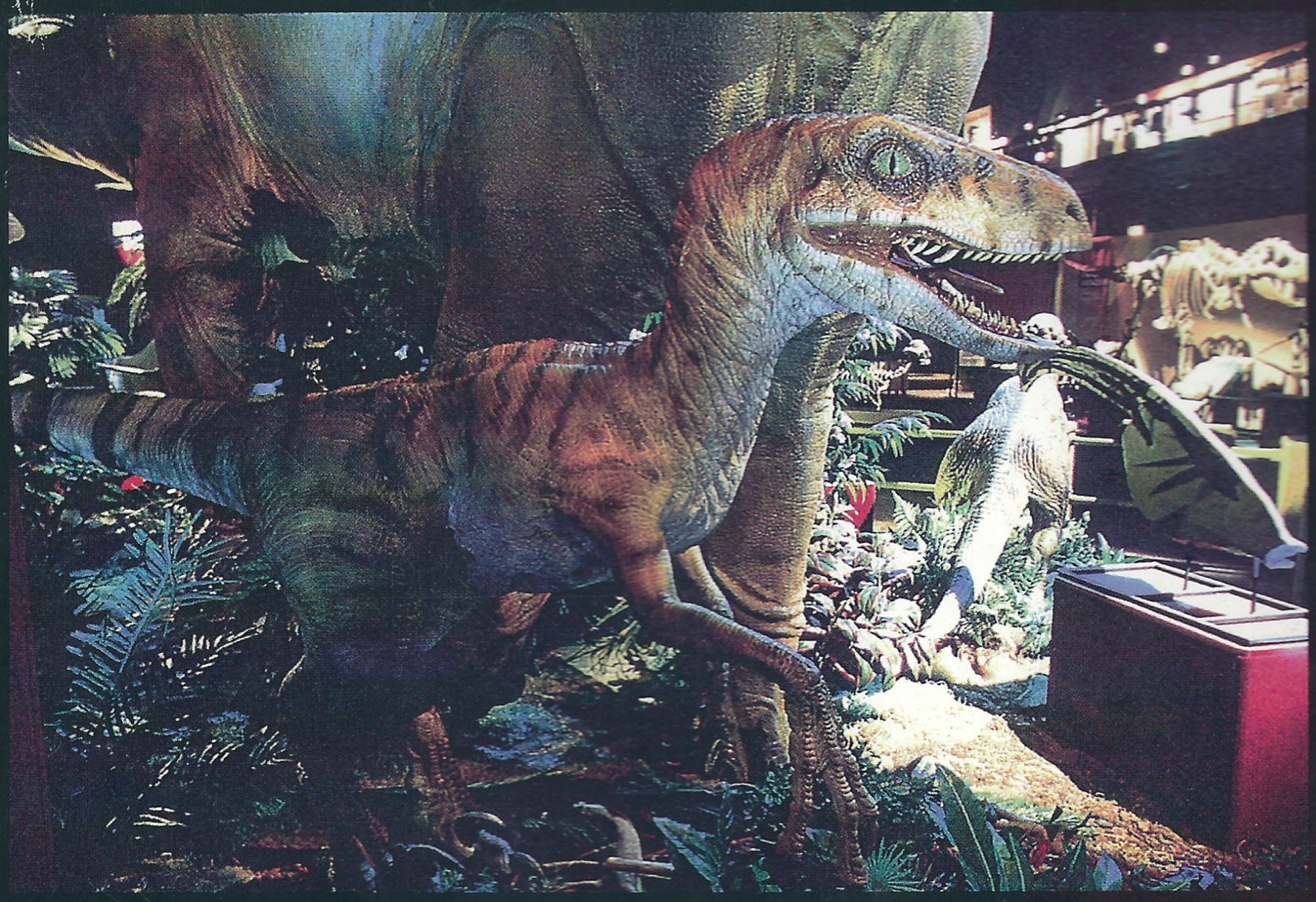

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CRETACEOUS
EARLY
CRETACEOUS
100 MILLION
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